PB-245 557

DIRECT FILTRATION OF LAKE SUPERIOR WATER FOR ASBESTIFORM FIBER REMOVAL. APPENDIX B. DESIGN, INSTALLATION AND OPERATION OF PILOT FILTERS. APPENDIX C. SUMMARY OF DATA FOR INDIVIDUAL FILTER RUNS

Black and Veatch

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June 1975

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16. ABSTRACT

Pilot plant research conducted in 1974 at Duluth, Minnescta, demonstrated that asbestiform fiber counts in Lake Superior water could be effectively reduced by municipal filtration plants. During the study, engineering data were also obtained for making cost estimates for construction and operation of both granular and diatomaceous earth (DE) filtration plants ranging in size from 0.03 to 30 mgd. Appendix B contains information on the pilot filters used in the study. Data are presented on the physical aspects of the units (dimensions and equipment configuration) and on the manner in which the filters were operated. Appendix C contains data obtained during the individual pilot plant filter runs. This kind of information will be useful to persons needing to know about specific conditions such as raw water turbidity, filtration rate, and chemical doses for diatomaceous earth types and amounts used for precoat or body feed.

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Appendix D

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DIRECT FILTRATION OF LAKE SUPERIOR WATER FOR ASBESTIFORM FIBER REMOVAL

Appendix B
Design, Installation and Operation of Pilot Filters

Appendix C
Summary of Data for Individual Filter Runs

By

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Kansas City, Missouri 64114

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OFFICE OF RESEARCH AND DEVELOPMENT
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The National Environmental Research Center -- Cincinnati has reviewed this report and approved its publication. Approval does not signify that the contents necessarily reflect the views and policies of the U.S. Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

FOREWORD

Man and his environment must be protected from the adverse effects of pesticides, radiation, noise and other forms of pollution, and the unwise management of solid waste. Efforts to protect the environment require a focus that recognizes the interplay between the components of our physical environment -- air, water, and land. The National Environmental Research Centers provide this multidisciplinary focus through programs engaged in

- studies on the effects of environmental contaminants on man and the biosphere, and
- a search for ways to prevent contamination and to recycle valuable resources.

This report and its appendices present the results of pilot plant filtration research for the removal of asbestiform fibers from drinking water. The several appendices present detailed information on water quality, pilot plant equipment and operation, individual filter run data, asbestiform fiber and amphibole mass concentrations in raw and filtered water, and diatomite filter optimization. Appendix B contains data on the pilot filters used and on operating techniques. Appendix C consists of tabulated operating data from all individual filter runs.

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Director
National Environmental
Research Center, Cincinnati

ABSTRACT

Pilot plant reserach conducted in 1974 at Duluth, Minnesota, demonstrated that asbestiform fiber counts in Lake Superior water could be effectively reduced by municipal filtration plants. During the study, engineering data were also obtained from making cost estimates for construction and operation of both granular and diatomaceous earth (DE) filtration plants ranging in size from 0.03 to 30 mgd.

Appendix B contains information on the pilot filters used in the study. Data are presented on the physical aspects of the units (dimensions and equipment configurations) and on the manner in which the filters were operated.

Appendix C contains data obtained during the individual pilot plant filter runs. This kind of information will be useful to persons needing to know about specific conditions such as raw water turbidity, filtration rate, and chemical doses or diatomaceous earth types and amounts used for precoat or body feed.

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APPENDIX B-1

EQUIPMENT DESIGN AND INSTALLATION

GENERAL

The pilot filtration study was conducted with two granular filters and four DE filters installed at the Lakewood Pumping Station in Duluth, Minnesota. The granular filters were a skid-mounted and a trailer mounted "WATER-BOY" unit as manufactured by Neptune MicroFLOC, Incorporated, Corvallis, Oregon. The DE filters were two pressure DE units supplied by the Corps of Engineers and two vacuum DE units as manufactured by the BIF Corporation, Providence, Rhode Island.

GRANULAR UNITS

The granular units used in the filtration study were designated MM-1 and MM-2 and are described in detail in the main report. Figures 1-7 are provided to illustrate the various features of the two units discussed in the report.

DIATOMACEOUS EARTH UNITS

The DE units used in the filtration study were designated as BIF (vacuum) and ERD-1 and ERD-2 (pressure). Although two vacuum filters were installed, only one unit was used for the study, with one unit provided as standby. The DE units are illustrated in Figures 8-13. Additional flow diagrams of the BIF and ERD units are presented in Figures 14-17. These diagrams show the alternative mixing modes that were utilized for some runs with the DE units.

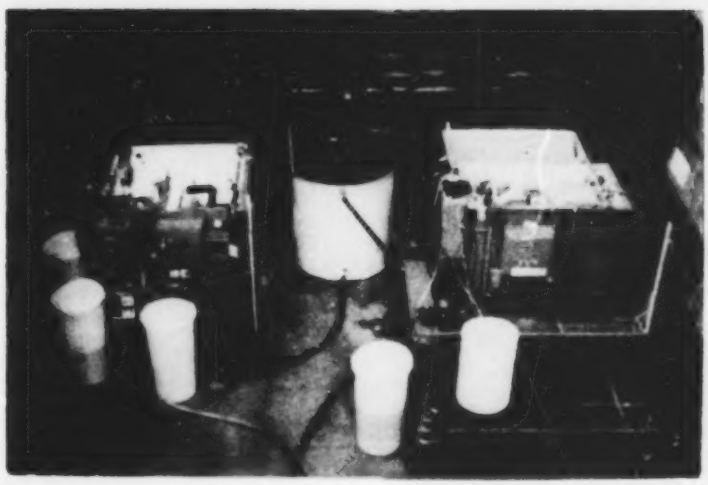

FIGURE 1 . GRANULAR UNITS, MM-1 AND MM-2 .

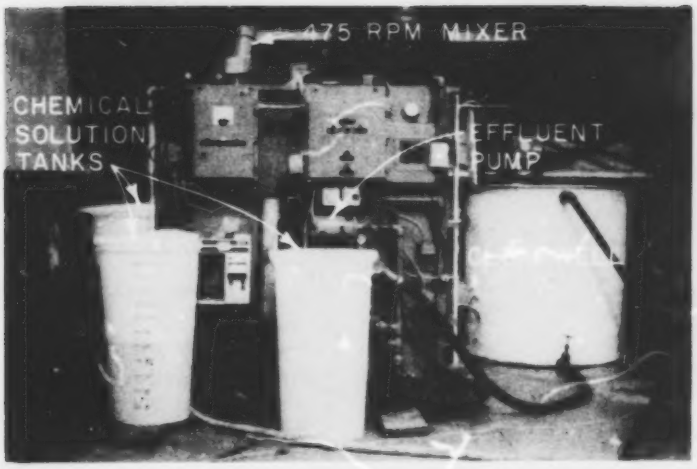

FIGURE 2 . FRONT VIEW MM-I .

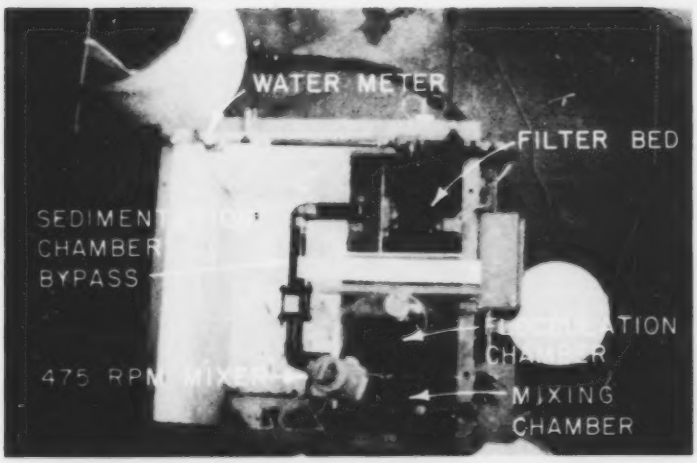

FIGURE 3 . TOP VIEW OF MM-I

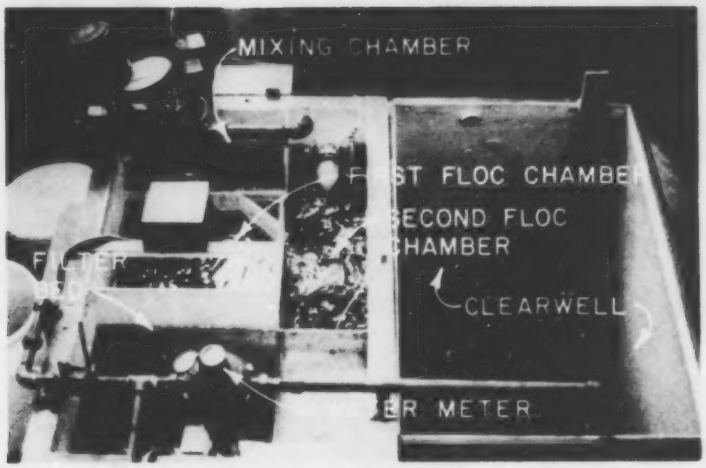

FIGURE 4 TOP VIEW MM-2

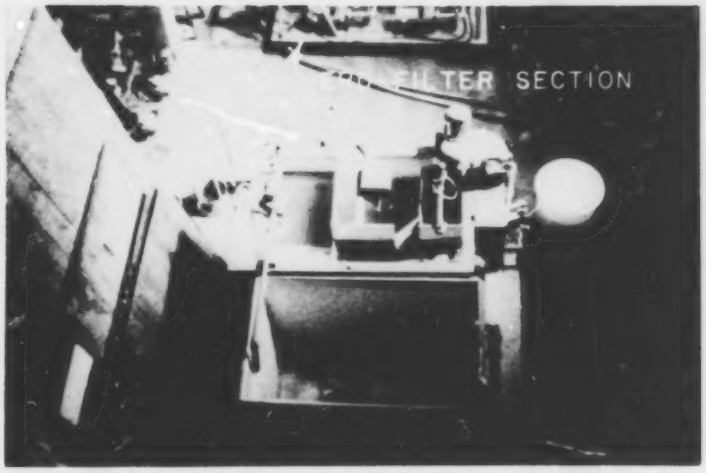

FIGURE 5 TOP VIEW OF MM-2 SHOWING LOCATION RELATIVE TO ERD.

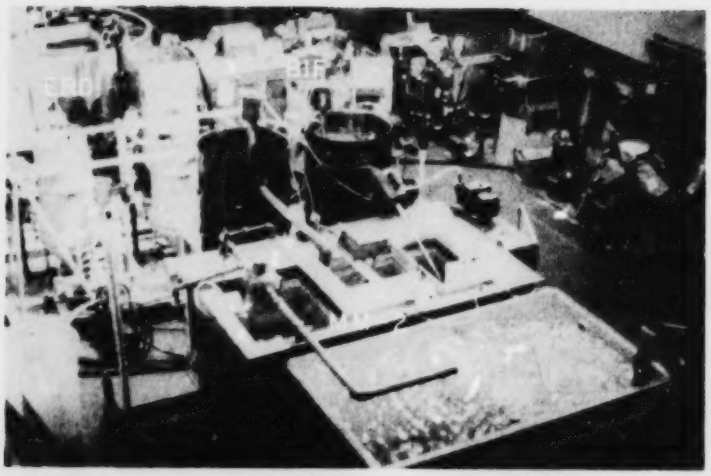

FIGURE 6 . TOP VIEW OF MM-2 SHOWING LOCATION RELATIVE TO OTHER UNITS.

FIGURE 7 . 55-GALLON DRUMS USED FOR MIXING CHAMBER WITH MM-2.

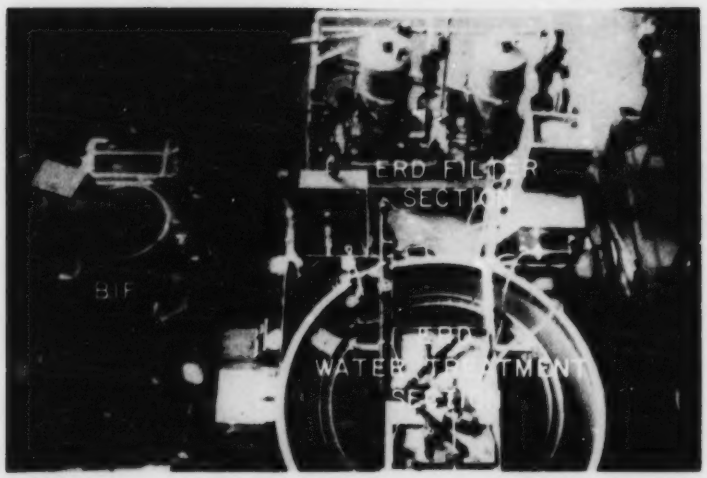

FIGURE 8 . TOP VIEW OF BIF AND ERD.

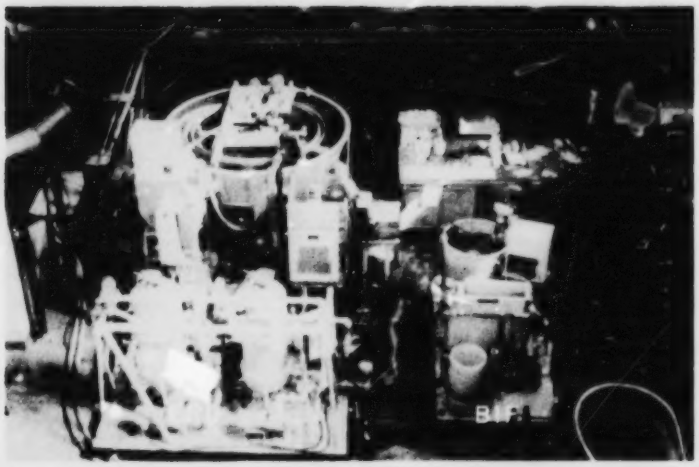

FIGURE 9 . TOP VIEW OF BIF AND ERD.

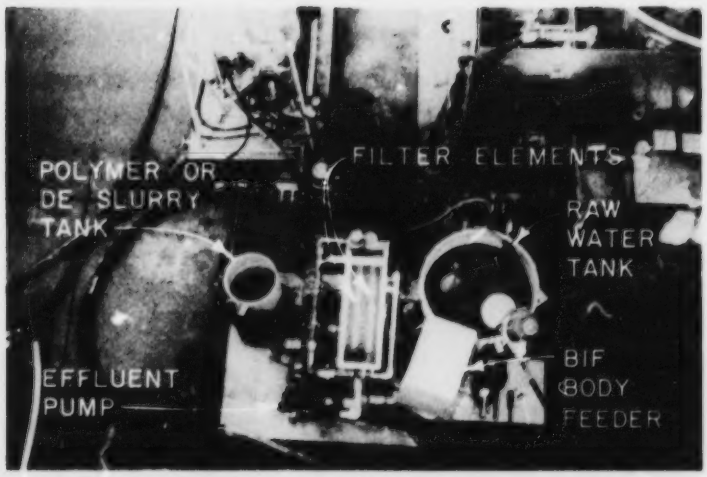

FIGURE 10 . TOP VIEW BIF .

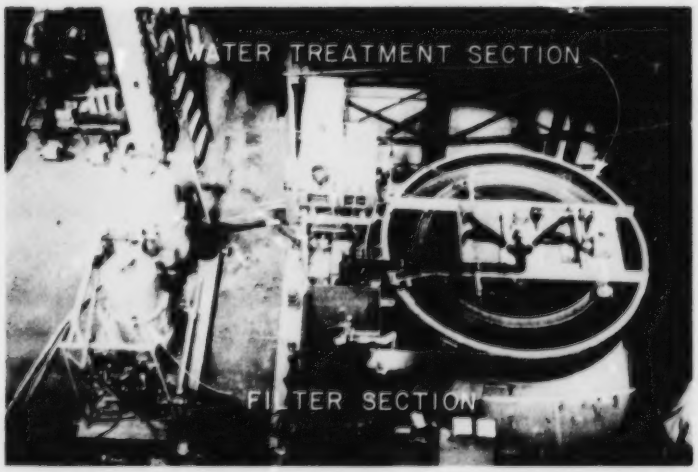

FIGURE 11 . TOP VIEW ERD .

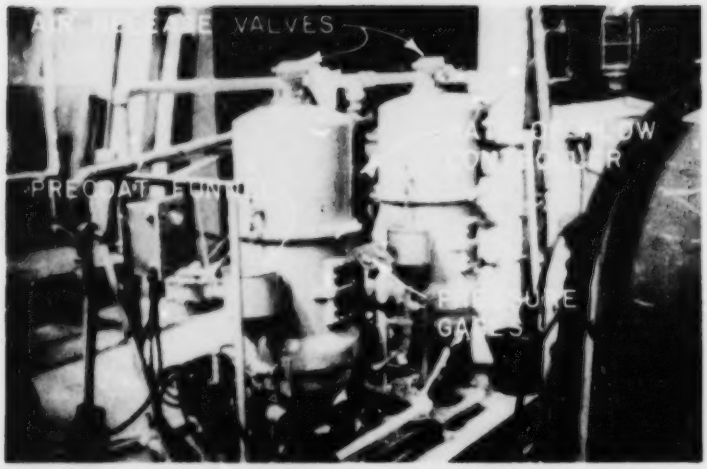

FIGURE 12 . FILTRATION SECTION OF ERD.

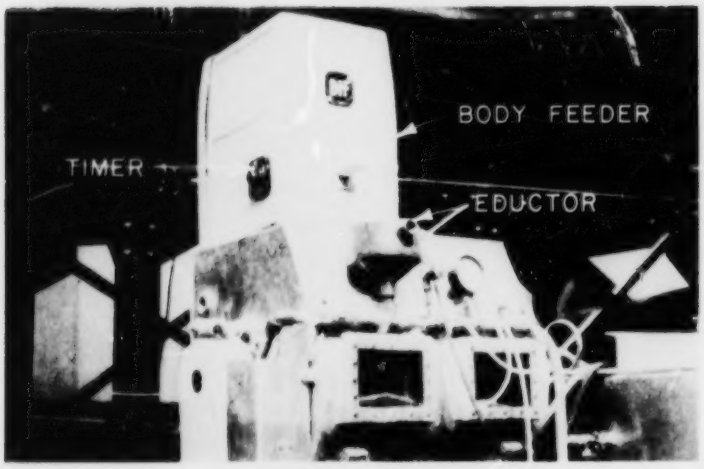

FIGURE 13 . BIF BODY FEEDER AND EDUCTOR USED WITH ERD.

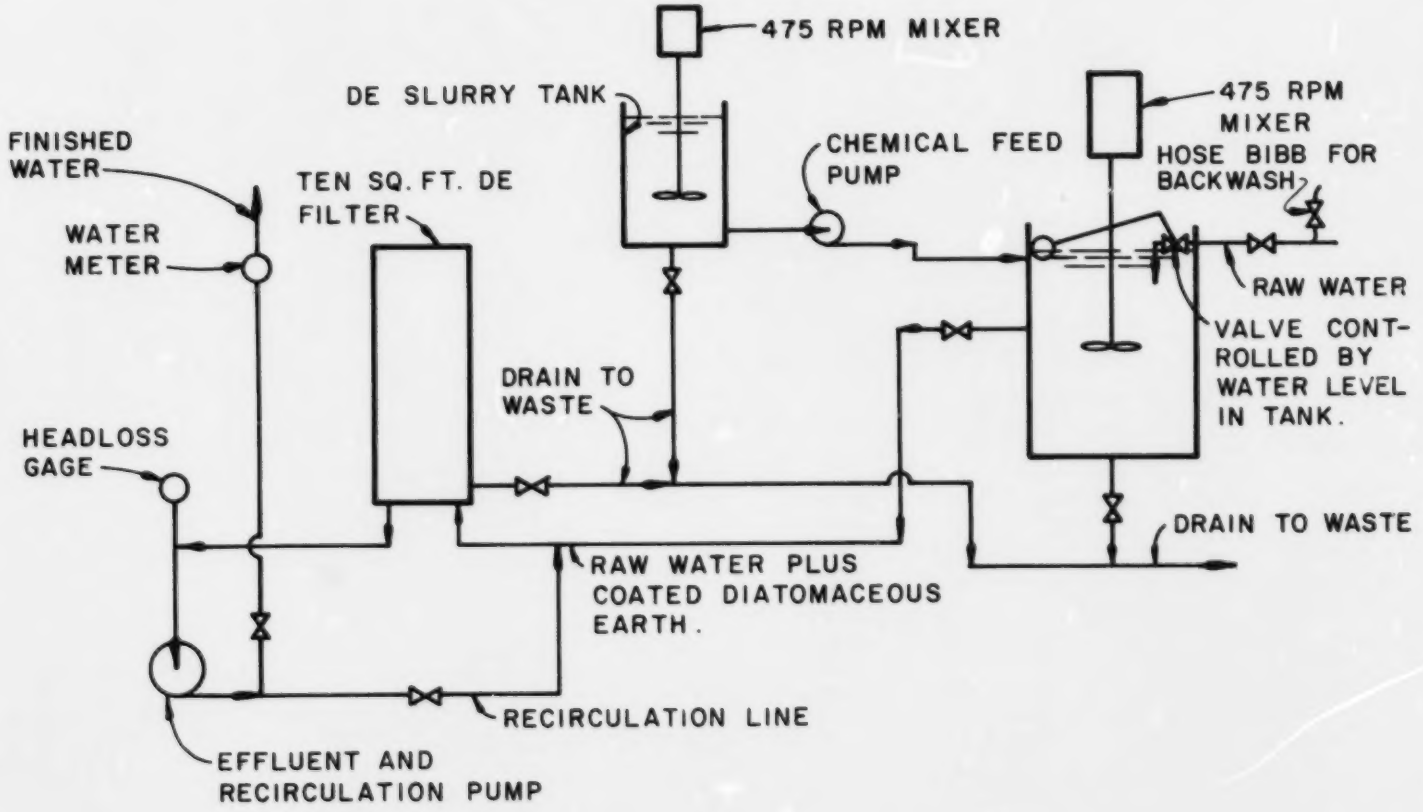

FIGURE 14 . FLOW DIAGRAM FOR BIF (ALT. 2)

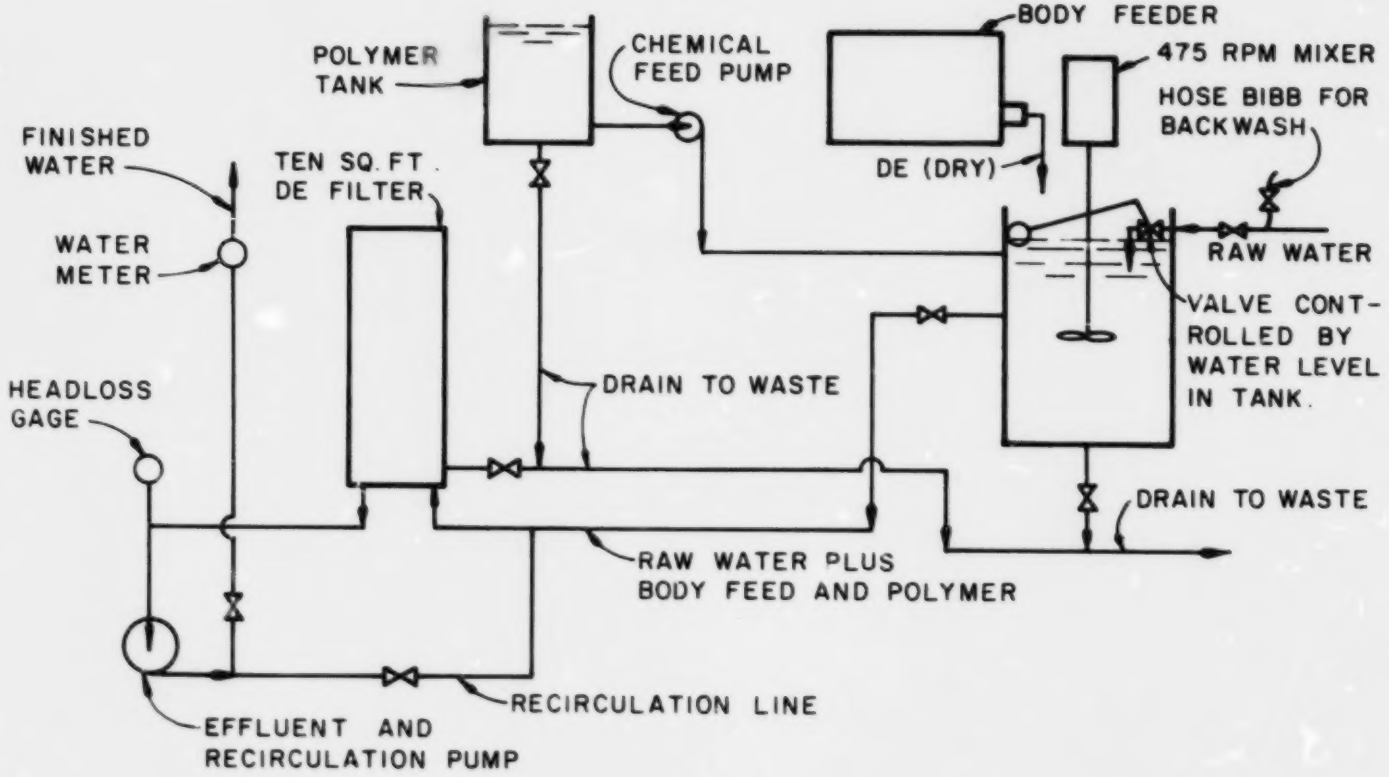

FIGURE 15 . FLOW DIAGRAM FOR BIF (ALT. 3)

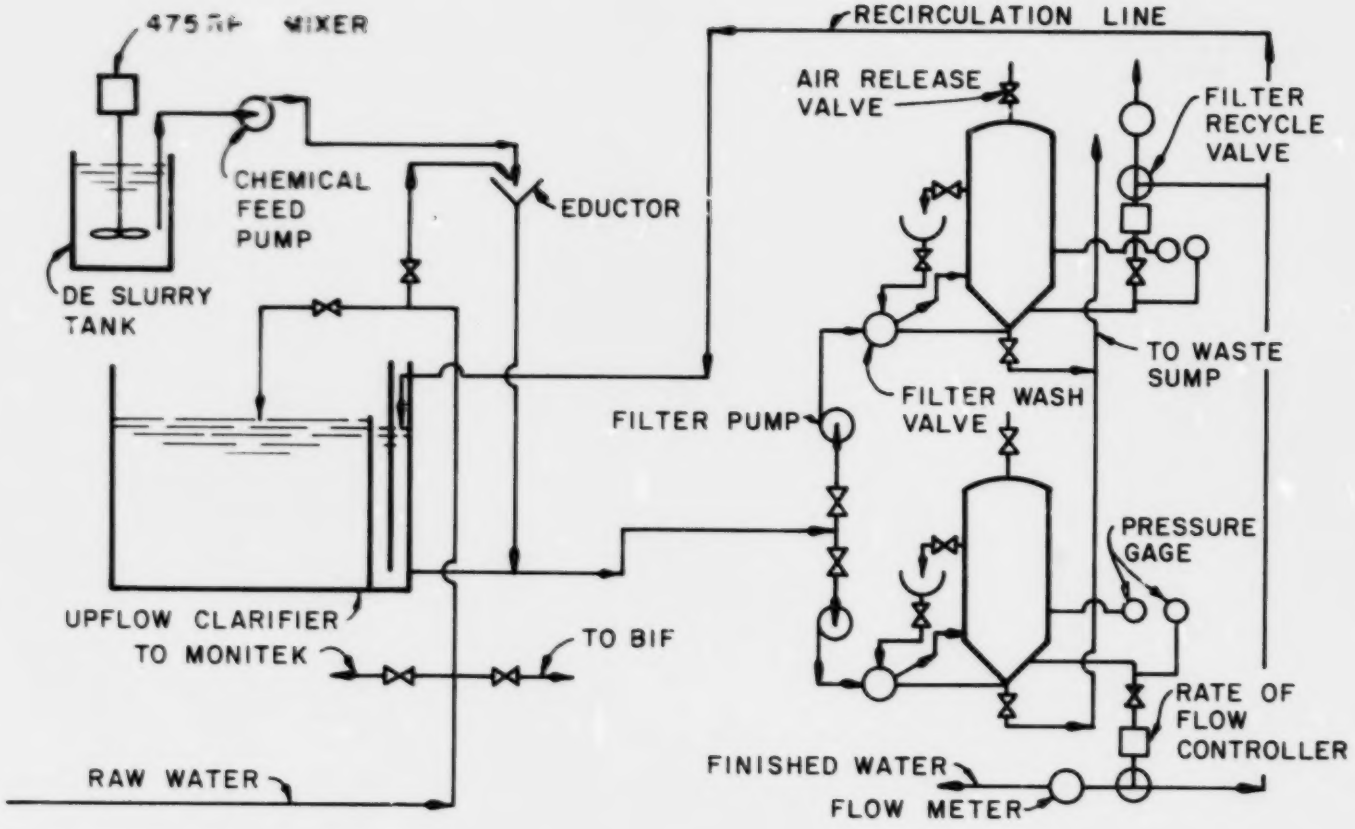

FIGURE 16 . FLOW DIAGRAM FOR ERD (ALT. 2)

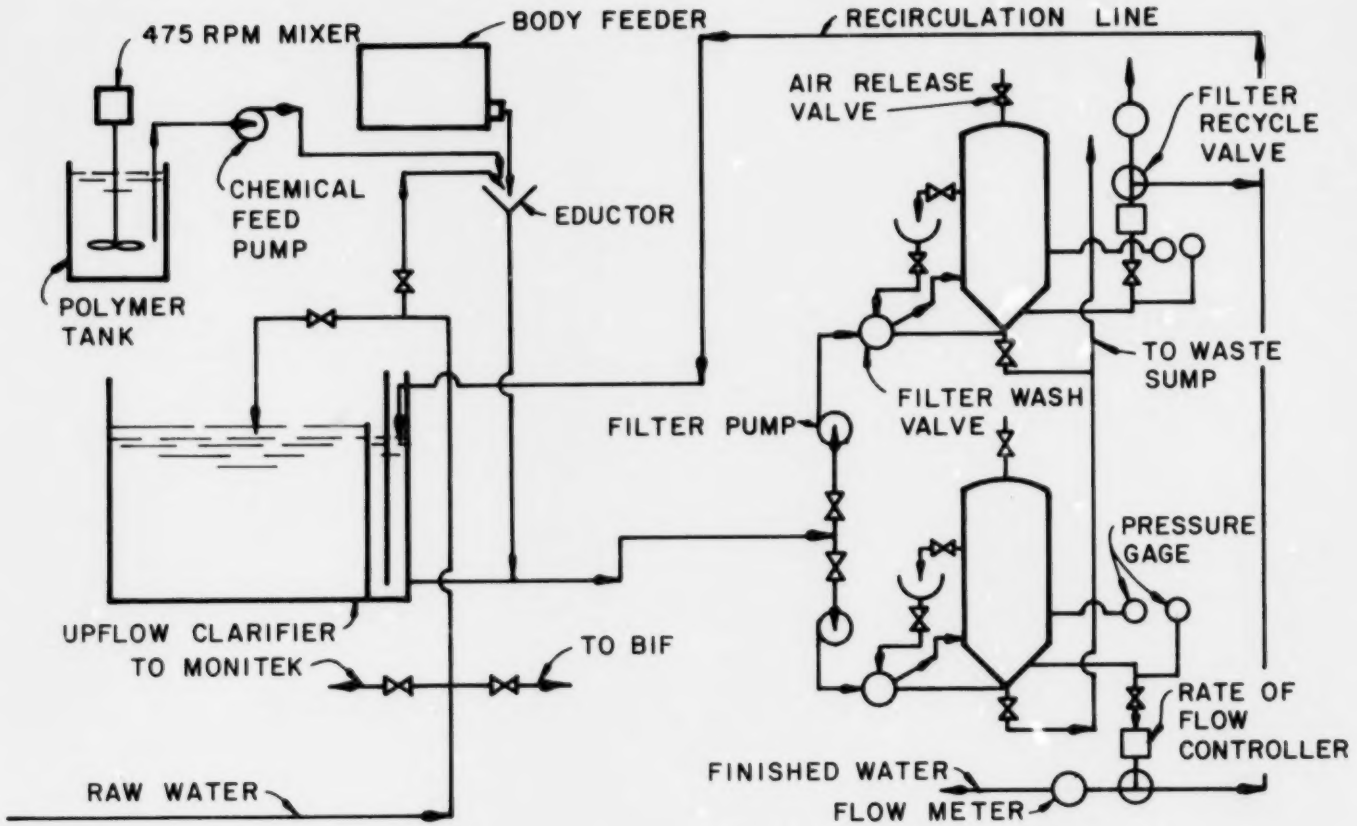

FIGURE 17 . FLOW DIAGRAM FOR ERD (ALT.3)

APPENDIX B-2

OPERATION OF PILOT FILTERS

RAW WATER SOURCES

With the exception of three runs on the MM-2 unit, all runs on the pilot filtration units were made using the Lakewood wetwell as the raw water source. The intake of the Lakewood Pumping Station extended approximately 1,500 ft out into Lake Superior and was about 70 ft below the surface of the lake. Suction hoses were placed directly in the wetwell and raw water was pumped to each of the filter units so that the raw water supplied to the units was the same as that being supplied to the City of Duluth.

Raw water from the Cloquet Pipeline Intake was used for three runs on the MM-2 units. The Cloquet raw water was transported from the Cloquet raw water pumping station on Minnesota Point to the Lakewood Pumping Station in a 4,800 gal tank truck. The suction of one of the pilot plant raw water pumps was connected to the discharge from the tank truck and the water pumped to the MM-2 unit. An illustration of the tank truck and raw water pump is given in Figure 18.

GRANULAR UNITS - CHEMICAL ADDITIONS

The solution concentration and point of application of the polymers were varied during the testing of the MM-1 unit, but the most common points of chemical application were the flocculation chamber when no sedimentation was provided, and the entrance to the sedimentation chamber when the tube settlers were installed. Several runs at the beginning of the study were conducted with the polymer added into the

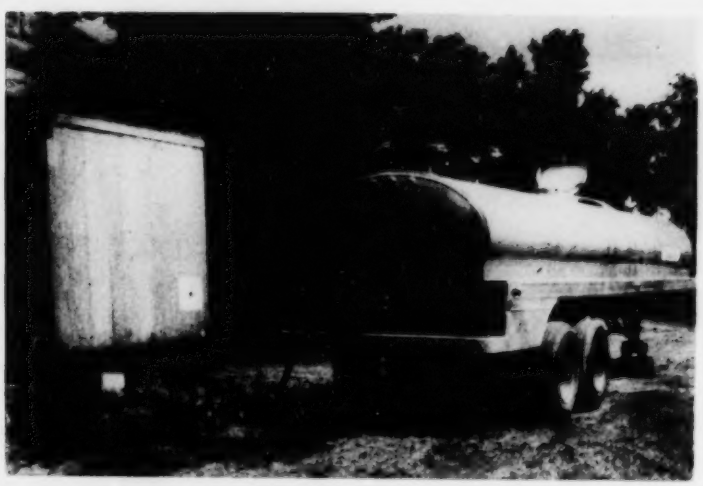

FIGURE 18 . 4800 GALLON TANK TRUCK TRANSPORT CLOQUET PIPELINE WATER TO PILOT PLANT.

mixing chamber with the alum. However, the purpose of the polymer as used during the pilot filter studies was to strengthen the floc produced by the primary coagulant and it was decided this could best be accomplished by adding the polymer subsequent to the coagulation step in the process. A summary of chemical solution strengths and points of application is given in Table 1.

TABLE 1. SUMMARY OF CHEMICAL ADDITIONS TO MM-1

Chemical	Solution concentration, per cent	Run No.	Point of application
Alum	1.19	1-44	Mixing chamber
	1.19	45-63	Mixing chamber
Alum	1.19	64-87	Mixing chamber
$FeCl_3$			
NP-10	0.0299	1-2	Mixing chamber
N-17	0.0599	4-11	Mixing chamber
N-17	0.0599	12-19	Flocculation chamber
847A	0.0567	20-24	Flocculation chamber
985N	0.0299	25-29	Flocculation chamber
985N	0.0149	30-49	Flocculation chamber
985N	0.0149	50-64	Just prior to filter
985N	0.0149	65-87	Entrance to sedimentation basin

Alum was used as the primary coagulant in 117 of the runs conducted on the unit and $FeCl_3$ in 23 runs. Alum dosages ranged from 5.44 mg/l to 37.86 mg/l with an average dosage of about 15 mg/l. $FeCl_3$ dosages ranged from 6.22 mg/l to 17.4 mg/l with an average dosage of about 11 mg/l. Numerous polymer solution concentrations and points of application were used during the pilot studies with the MM-2 unit, and are summarized in Table 2.

TABLE 2. SUMMARY OF CHEMICAL ADDITIONS TO MM-2.

Chemical	Solution Concentration, per cent	Run No.	Point of Application
$FeCl_3$	1.19	1-23	Mixing Chamber
Alum	1.19	24-92	Mixing Chamber
Alum	1.19	93-120, 138-140	1st mixing tank
Alum	1.19	121-123, 129-137	Prior to 1st Kenics mixer
Alum	1.19	124-128	Prior to 2nd Kenics mixer
C-31	0.119	1-16	Mixing Chamber
N-17	0.0599	17-18	Mixing Chamber
N-17	0.0599	20, 22-27, 34-41	1st floc Chamber
N-17	0.0599	19, 21	2nd floc Chamber
985N	0.0599	28-33, 42-51	1st floc Chamber
985N	0.0299	52-53	1st floc Chamber
985N	0.0149	54-92	1st floc Chamber
985N	0.0149	93-115, 119, 120, 138, 140	2nd mixing tank
A-23	0.0599	116, 118	1st mixing tank
Catfloc B	0.119	116, 117, 118	2nd mixing tank
A-23	0.0299	119, 120, 138, 139	1st mixing tank
985N	0.0149	121-123, 129-133	Prior to 2nd Kenics mixer
A-23	0.0599	124-128	Prior to 1st Kenics mixer
985N	0.0149	124, 127, 128	Prior to 3rd Kenics mixer
C-31	0.119	125, 126	Prior to 3rd Kenics mixer
C-31	0.119	134	Prior to 2nd Kenics mixer
C-31	0.119	135-137	Prior to 2nd pair of Kenics mixers
C-31	0.119	139	2nd mixing tank

APPENDIX C-1 GRANULAR MEDIA FILTRATION (MM-1) SUMMARY OF INDIVIDUAL RUNS

Run No.	Date	Filter rate, gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lb / 1000 gal	Polymer, lb / 1000 gal	Backwash solids, lb /1000 gal Sedi.	Filter	Total	B.W. vol., as % of treated water	Avg. turb. (Turb @ time of sample), TU . Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
Dual media filtra. w/o sedi., Alum & polymer added to mixing chamber, Lakewood water.																					
1	5/13	3.89 (228.23)	Alum 12.3	Separan NP-10 0.17	0.102	0.0014	–	–	–	4.97%	0.90	0.40							8.0	0.73	9.23
2	5/13	4.18 (245.24)	Alum 12.3	Separan NP-10 0.26	0.103	0.0022	–	–	–	3.43%	0.90	0.32							8.0	0.38	10.25
3	2 Hr.	run terminated.	Polymer	not mixed.																	
4	5/14	4.04 (237.03)	Alum 16.61	N-17 0.22	0.139	0.0018	–	–	–	4.94%	2.4	0.24							8.0	0.14	7.50
5	5/15	3.28 (192.44)	Alum 18.6	N-17 0.35	0.155	0.0029	–	–	–	5.18%	1.3	0.20							8.0	0.58	10.75
6	5/15	3.19 (187.16)	Alum 20.48	N-17 0.39	0.171	0.0032	–	–	–	6.30%	1.4	0.21							8.0	0.26	8.33
7	5/16	3.46 (203.00)	Alum 17.88	N-17 0.38	0.149	0.0031	–	–	–	3.61%	0.80 (0.74)	0.20 (0.15)	A=2.61 C=1.35	A=BDL C=0.130	0.14	0.005			8.0	0.16	6.75 (4.9)
8	5/16	3.64 (213.56)	Alum 17.82	N-17 0.286	0.149	0.0024	–	–	–	2.66%	1.1	0.21							8.0	0.16	8.25
9	5/17	3.57 (209.45)	Alum 18.1	N-17 0.25	0.151	0.0021	–	–	–	3.09%	1.14	0.15							8.0	0.11	7.17
10	5/17	3.61 (211.80)	Alum 17.5	N-17 0.23	0.146	0.0019	–	–	–	3.25%	0.85	0.25							8.0	0.32	8.73
11	5/18	3.72 (218.25)	Alum 17.6	N-17 0.27	0.147	0.0023	–	–	–	5.52%[a]	0.95	0.30							6.4	0.19	6.08
Polymer feed moved to influent of floc. chamber																					
12	5/20	3.77 (221.19)	Alum 16.96	N-17 0.272	0.142	0.0023	–	–	–	2.53%	0.85	0.23							8.0	0.15	7.83
13	5/20	3.83 (224.71)	Alum 16.2	N-17 0.33	0.135	0.0028	–	–	–	3.66%	1.09	0.14							8.0	0.11	6.07
14	5/21	3.99 (234.09)	Alum 18.28	N-17 0.293	0.152	0.0025	–	0.034	0.034	2.72%	0.90	0.25							8.0	0.26	7.71

APPENDIX C-1 (CONTINUED).

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lb / 1000 gal.	Polymer, lb / 1000 gal.	Backwash solids, lb /1000 gal. Sedi.	Filter	Total	B.W. vol., as % of treated water	Avg. turb. (Turb @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
15	5/21	3.44 (201.83)	Alum 15.51	N-17 0.35	0.130	0.0029	–	0.022	0.022	2.59%	0.80	0.32							8.0	0.22	8.28
16	5/22	3.86 (226.47)	Alum 14.32	N-17 0.339	0.119	0.0028	–	0.055	0.055	4.09%	0.89 (0.94)	0.30 (0.42)			0.20	< 0.01			8.0	0.41	7.85 (6.1)
17	5/22	3.92 (229.99)	Alum 14.79	N-17 0.37	0.123	0.0027	–	0.022	0.022	3.70%	0.85	0.45							8.0	0.33	6.60
18	5/22	3.98 (233.51)	Alum 15.42	N-17 0.41	0.129	0.0034	–	0.036	0.036	3.78%	0.92	0.35							8.0	0.25	6.70
19	5/23	4.16 (244.07)	Alum 14.23	N-17 0.418	0.119	0.0035	–	0.069	0.069	5.31%	0.90	0.42							8.0	0.47	6.09
20	5/23	3.96 (232.33)	Alum 15.71	847-A 0.232	0.131	0.0019	–	0.028	0.028	3.00%	1.4	0.15							8.0	0.15	8.49
21	5/23	3.83 (244.71)	Alum 15.51	847-A 0.260	0.129	0.0022	–	0.049	0.049	2.43%	0.95	0.15							8.0	0.11	8.93
22	5/24	3.79 (222.36)	Alum 16.65	847-A 0.098	0.139	0.00082	–	0.044	0.044	1.56%	1.2	0.15							8.0	0.34	14.00
23	5/28	3.82 (224.12)	Alum 21.36	847-A 0.110	0.178	0.00092	–	0.062	0.062	2.13%	0.82	0.16							8.0	0.38	13.02
24	5/28	4.13 (242.31)	Alum 16.04	847-A 0.099	0.134	0.00083	–	0.039	0.039	1.31%	0.85	0.20							8.0	1.50	17.33
25	5/29	3.83 (224.71)	Alum 13.18	985-N 0.123	0.110	0.0010	–	0.021	0.021	2.59%	0.83	0.15							8.0	0.13	13.70
26	5/30	3.65 (214.15)	Alum 14.15	985-N 0.123	0.118	0.0010	–	0.037	0.037	2.62%	0.82 (0.80)	0.15 (0.15)	A=1.43 C=1.83	A=BDL C=0.26	0.19	< 0.01			8.0	0.19	16.33 (2.6)
27	5/31	4.14 (242.89)	Alum 12.46	985-N 0.054	0.104	0.00045	–	0.030	0.030	1.13%	0.85	0.19							8.0	0.15	20.16
28	6/3	4.05 (237.61)	Alum 13.3	985-N 0.061	0.111	0.00051	–	0.025	0.025	1.45%	0.78	0.11							8.0	0.07	19.75
29	6/4	4.01 (235.27)	Alum 14.2	985-N 0.062	0.118	0.00052	–	0.018	0.018	1.42%	0.82 (0.86)	0.10 (0.10)	A=1.74 C=2.91	A=BDL C=0.475	0.26	< 0.006			8.0	0.12	18.68 (3.2)

APPENDIX C-1 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer mg/l	Coag., lb /1000 gal.	Polymer, lb /1000 gal.	Backwash solids, lb /1000 gal. Sedi.	Filter	Total	B.W. vol., as % of treated water	Avg. turb. (Turb @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
30	6/5	4.03 (236.44)	Alum 13.7	985-N 0.047	0.114	0.00039	–	0.038	0.038	1.95%	0.80	0.11							8.0	0.09	18.25
31	6/6	3.93 (230.57)	Alum 12.6	985-N 0.062	0.105	0.00053	–	0.026	0.026	1.62%	1.53 (0.74)	0.12 (0.09)	A=1.5 C=2.3	A=BDL C=0.35	0.18	< 0.005			8.0	0.15	19.75 (6.7)
32	6/7	4.09 (239.96)	Alum 11.95	985-N 0.022	0.100	0.00018	–	0.048	0.048	1.50%	3.6	0.16							8.0	0.12	21.58
33	6/10	3.89 (228.23)	Alum 12.43	985-N 0.055	0.104	0.00046	–	–	–		3.9	0.19							6.8	1.7	24.75
34	6/11	3.92 (229.99)	Alum 12.21	985-N 0.08	0.102	0.00067	–	–	–		2.98 (1.90)	0.15 (0.25)	A=1.0 C=1.6	A=0.17 C=0.17	0.18	0.006			8.0	0.16	17.92 (1.0)
35	6/12	4.10 (240.55)	Alum 13.08	985-N 0.074	0.109	0.00062	–	0.046	0.046	1.25%	2.2	0.12							8.0	0.11	17.50
36	6/13	4.07 (238.79)	Alum 16.13	985-N 0.071	0.134	0.00059	–	0.028	0.028	2.85%	2.1 (2.1)	0.13 (0.16)	A=0.48 C=0.41	A=BDL C=0.57			33.25	0.53	8.0	0.14	11.75 (8.0)
37	No Alum added – Mechanical failure																				
38	6/14	4.07 (238.79)	Alum 14.48	985-N 0.063	0.121	0.00053	–	0.048	0.048	1.81%	1.8	0.12							8.0	0.07	16.18
39	6/17	4.06 (238.20)	Alum 16.85	985-N 0.057	0.141	0.00048	–	–			0.95 (0.96)	0.11 (0.10)	A=0.61 C=2.15	A=BDL C=0.44	0.17	< 0.006	10.64	0.23	8.0	0.11	14.71 (1.9)
40	6/18	3.91 (229.40)	Alum 17.01	985-N 0.048	0.142	0.00040	–	0.050	0.050	1.93%	0.90	0.12							5.1	0.85	16.53
Sedimentation tube settlers installed.																					
41	6/19	3.81 (223.53)	Alum 19.01	985-N 0.054	0.159	0.00046	0.015	–	0.015	1.63%	0.90	0.09							6.1	0.80	26.83
42	6/20	3.75 (220.01)	Alum 18.28	985-N 0.085	0.152	0.00071	0.021	–	0.021	1.22%	1.25	0.10							8.0	0.10	25.03
43	6/21	4.05 (237.61)	Alum 14.27	985-N 0.066	0.119	0.00055	0.022	–	0.022	3.53%[a]	1.1	0.09							3.6	0.07	11.66
44	6/24	3.98 (233.51)	Alum 14.81	985-N 0.078	0.124	0.00065	0.014	–	0.014	1.16%	0.66 (0.66)	0.09 (0.11)	A=1.0 C=3.9	A=BDL C=0.13			6.03	0.92	8.0	0.04	25.83 (3.7)

APPENDIX C-1 (CONTINUED)

Run No.	Date	Filter rate gpm/ft² (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lb / 1000 gal.	Polymer, lb / 1000 gal.	Backwash solids, lb /1000 gal. Sedi.	Filter	Total	B.W. vol., as % of treated water	Avg. turb. (Turb @ time of sample), TU Raw	Filter	ORF Fibers x 10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibers x 10^6/l Raw	Filter	Terminal Hl. Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
Now using Ferric Chloride as a coagulant added to mixing chamber.																					
45	6/25	4.06 (238.20)	$FeCl_3$ 12.16	985-N 0.058	0.101	0.00048	0.021	–	0.021	1.45%	0.66	0.25							5.8	0.78	21.22
46	6/26	4.28 (251.11)	$FeCl_3$ 11.42	985-N 0.071	0.095	0.00060	0.026	–	0.026	2.70%	0.68	0.12							3.7	0.33	15.33
47	6/27	4.10 (240.55)	$FeCl_3$ 11.81	985-N 0.073	0.098	0.00062	0.059	–	0.059	2.33%	0.73	0.11							4.3	0.65	18.58
48	6/28	4.12 (241.72)	$FeCl_3$ 12.0	985-N 0.094	0.100	0.00078	0.083	–	0.083	2.50%	0.65 (0.64)	0.09 (0.14)	A=1.11 C=8.12	A=BDL C=1.37	0.16	0.007	5.54	0.51	3.8	0.38	16.17 (13.3)
49	6/28	4.11 (241.13)	$FeCl_3$ 12.24	985-N 0.094	0.102	0.00079	0.066	–	0.066	3.14%[a]	0.69	0.10							2.9	0.08	12.42
Polymer input just ahead of filter bed.																					
50	7/1	4.06 (238.20)	$FeCl_3$ 12.21	985-N 0.103	0.102	0.00086	0.028	–	0.028	1.53%	0.78	0.12							8.0	0.49	19.43
51	7/2	3.69 (216.49)	$FeCl_3$ 12.25	985-N 0.105	0.102	0.00088	0.042	–	0.042	1.92%	0.77	0.09							8.0	0.10	14.59
52	7/3	3.86 (226.47)	$FeCl_3$ 16.49	985-N 0.087	0.138	0.00073	0.040	–	0.040	3.81%	0.77 (0.69)	0.07 (0.07)	A=0.56 C=3.57	A=BDL C=0.28	0.07	<0.004	2.99	0.91	8.0	0.07	9.09 (9.0)
53	7/3	4.08 (239.37)	$FeCl_3$ 13.78	985-N 0.057	0.115	0.00048	0.036	–	0.036	2.87%	0.73	0.11							8.0	0.10	9.18
54	7/4	4.10 (240.55)	$FeCl_3$ 14.97	985-N 0.062	0.125	0.00052	0.039	–	0.039	3.74%	0.67	0.08							8.0	0.07	10.90
55	7/4	4.08 (239.37)	$FeCl_3$ 14.77	985-N 0.035	0.123	0.00029	0.044	–	0.044	2.31%	0.62	0.11							8.0	0.11	11.02
56	7/8	4.08 (239.37)	$FeCl_3$ 14.29	985-N 0.055	0.119	0.00046	0.106	–	0.106	2.52%	0.67	0.09							8.0	0.08	13.23
57	7/9	3.98 (228.23)	$FeCl_3$ 16.35	985-N 0.048	0.136	0.00040	0.077	–	0.077	2.15%	0.65	0.09							8.0	0.14	12.53

APPENDIX C-1 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lb / 1000 gal.	Polymer, lb / 1000 gal.	Backwash solids, lb /1000 gal. Sedi.	Filter	Total	B.W. vol., as % of treated water	Avg. turb. (Turb @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
58	7/9	3.68 (215.91)	$FeCl_3$ 17.54	985-N 0.069	0.146	0.00057	0.070	–	0.070	3.66%	0.97	0.14							8.0	0.44	10.73
59	7/10	4.08 (239.37)	$FeCl_3$ 7.36	985-N 0.061	0.061	0.00051	0.151	–	0.151	2.18%	1.25	0.21							8.0	0.06	12.81
60	7/11	3.64 (213.56)	$FeCl_3$ 14.79	985-N 0.054	0.123	0.00045	0.055	–	0.055	3.23%	1.01	0.10							8.0	0.11	10.25
61	7/11	3.94 (231.16)	$FeCl_3$ 12.81	985-N 0.059	0.107	0.00050	0.071	–	0.071	2.76%	1.81	0.10							8.0	0.08	13.20
62	7/12	3.93 (230.57)	$FeCl_3$ 12.36	985-N 0.065	0.103	0.00055	0.061	–	0.061	2.38%	1.15	0.10							8.0	0.10	11.23
63	7/12	3.89 (228.23)	$FeCl_3$ 12.73	985-N 0.067	0.106	0.00056	0.084	–	0.084	4.47%[a]	0.77	0.12							4.1	0.11	9.58
Changed to Alum as a coagulant to mixing chamber.																					
64	7/15	3.89 (228.23)	Alum 12.99	985-N 0.041	0.108	0.00034	0.045	–	0.045	2.00%	0.68	0.09							7.1	0.49	21.92
Polymer discharge moved from filter to Sedimentation Basin																					
65	7/16	3.90 (228.81)	Alum 11.82	985-N 0.037	0.099	0.00031	0.015	–	0.015	1.81%	0.70	0.11							8.0	0.17	22.76
66	7/17	3.87 (227.05)	Alum 12.10	985-N 0.039	0.101	0.00033	0.027	–	0.027	1.83%	0.72	0.10							8.0	0.12	21.05
67	7/19	3.85 (225.88)	Alum 10.99	985-N 0.039	0.092	0.00033	0.024	–	0.024	1.67%	0.83 (0.90)	0.11 (0.10)	A=0.52 C=0.35	A=BDL C=0.15	0.13	<0.003	266.0	0.66	8.0	0.12	21.03 (20.1)
68	7/19	3.93 (230.57)	Alum 11.67	985-N 0.050	0.097	0.00042	0.039	–	0.039	2.62%[a]	0.68	0.10							5.8	0.10	14.17
69	7/22	3.97 (232.92)	Alum 11.86	985-N 0.025	0.099	0.00021	0.030	–	0.030	1.93%	0.65	0.09							8.0	0.14	20.08
70	7/23	3.88 (227.64)	Alum 12.20	985-N 0.026	0.102	0.00022	0.019	–	0.019	2.02%	0.60 (0.57)	0.08 (0.07)	A=0.54 C=0.09	A=BDL C=0.07	0.09	<0.003	26.0	0.35	8.0	0.10	19.72 (4.5)
71	7/24	3.83 (224.71)	Alum 11.24	985-N 0.025	0.094	0.00021	0.027	–	0.027	–	0.82	0.09							8.0	0.11	18.49

APPENDIX C-1 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lb / 1000 gal	Polymer, lb / 1000 gal	Backwash solids, lb /1000 gal. Sedi.	Filter	Total	B.W. vol., as % of treated water	Avg. turb. (Turb @ time of sample), TU Raw	Filter	ORF Fibers x 10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibers x 10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
72	7/25	3.86 (226.47)	Alum 10.71	985-N 0.029	0.089	0.00024	0.076	–	0.076	1.85%	0.73 (0.66)	0.11 (0.07)	A=0.11 C=1.43	A=BDL C=0.37	0.04	<0.005	60.5	0.46	8.0	0.12	22.58 (7.8)
73	7/26	3.31 (194.20)	Alum 13.09	985-N 0.041	0.109	0.00034	0.046	0.032	0.078	1.93%	0.66	0.10							8.0	0.14	24.58
74	7/30	3.27 (191.85)	Alum 15.56	985-N 0.034	0.130	0.00028	0.060	0.024	0.084	1.48%	0.73 (0.69)	0.10 (0.08)	A=0.11 C=0.11	A=BDL C=BDL	0.06	<0.003	26.6	0.18	6.6	0.31	34.33 (22.8)
75	7/30	3.31 (194.20)	Alum 15.28	985-N 0.034	0.127	0.00029	0.057	0.049	0.106	1.70%	0.79	0.09							5.0	0.35	29.67
76	8/1	3.13 (183.64)	Alum 15.73	985-N 0.037	0.131	0.00031	0.024	0.037	0.061	1.63%	1.07 (0.87)	0.09 (0.07)	A=0.22 C=0.15	A=BDL C=0.22	0.08	<0.004	30.0	0.72	8.0	0.12	32.06 (7.3)
77	8/2	3.08 (180.70)	Alum 16.30	985-N 0.031	0.136	0.00026	0.060	0.025	0.085	3.96%	0.97	0.09							8.0	0.10	9.78
78	8/6	3.28 (192.44)	Alum 15.08	985-N 0.039	0.126	0.00033	0.009	0.039	0.048	1.35%	0.64 (0.58)	0.09 (0.07)	A=0.6 C=0.3	A=BDL C=0.06	0.09	<0.004	10.2	0.20	8.0	0.09	30.92 (23.3)
79	8/6	3.44 (201.825)	Alum 15.43	985-N 0.035	0.129	0.00029	0.006	0.058	0.064	1.50%	0.65	0.10							5.1	0.12	32.33
80	8/8	3.81 (223.53)	Alum 13.69	985-N 0.038	0.114	0.00032	0.004	0.059	0.063	1.83%	1.12 (0.68)	0.12 (0.08)	A=0.06 C=0.09	A=0.04 C=0.2	0.05	<0.003	15.1	0.45	4.7	0.40	23.97 (2.7)
81	8/9	3.82 (224.12)	Alum 13.35	985-N 0.034	0.111	0.00028	0.012	0.076	0.088	1.82%	1.12	0.14							7.9	0.21	24.00
82	8/13	3.69 (216.49)	Alum 15.49	985-N 0.033	0.129	0.00028	0.010	0.051	0.061	1.42%	0.66 (0.60)	0.09 (0.10)	A=0.13 C=0.2	A=BDL C=0.03	0.06	<0.003	20.0	0.38	8.0	0.15	25.83 (22.5)
83	8/13	3.76 (220.60)	Alum 14.72	985-N 0.033	0.123	0.00027	0.009	0.045	0.054	1.57%	0.71	0.08							7.5	0.32	28.08
84	8/15	3.74 (219.43)	Alum 15.13	985-N 0.036	0.126	0.00030	0.020	0.045	0.065	1.36%	0.61 (0.71)	0.06 (0.06)	A=0.09 C=0.17	A=BDL C=0.52	0.06	<0.003	8.98	0.55	8.0	0.07	30.87 (12.3)
85	8/16	3.61 (211.80)	Alum 14.62	985-N 0.033	0.122	0.00027	0.022	0.021	0.043	1.86%[a]	0.76	0.09							4.8	0.11	24.83
86	8/21	3.75 (220.01)	Alum 17.96	985-N 0.060	0.150	0.00050	0.014	0.028	0.042	2.00%	0.65 (0.58)	0.08 (0.08)	A=0.12 C=0.37	A=BDL C=0.13	0.03	<0.003	13.6	0.31	8.0	0.06	20.25 (0.8)

APPENDIX C-1 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lbs./1000 gal.	Polymer, lbs./1000 gal.	Backwash solids, lbs/1000 gal. Sedi.	Filter	Total	B.W. vol., as % of treated water	Avg. turb. (Turb @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
	8/22										(0.68)	(0.06)	A=0.13 C=0.37	A=BDL C=0.22	0.03	<0.003	13.6	0.49			(16.1)
	8/22										(0.76)	(0.15)	A=0.13 C=0.37	A=BDL C=0.80	0.03	<0.003	13.6	0.37			(22.0)
Used coagulant aid. Backwash solids calculated from Chem. Additions.																					
87	9/18	3.49 (204.76)	Alum 21.46	985-N 0.067			–	–	0.403	2.39%	0.55 (0.52)	0.12 (0.10)	A=0.6 C=0.09	A=1.0 C=0.7	0.10	<0.003	13.8	1.46	8.0	0.10	18.53 (18.1)
			Coagulant Aid Bentonite 26.83		0.224																

[a] Run did not reach terminal H_L or turbidity.

[b] A=amphibole, C=chrysotile

APPENDIX C-2 GRANULAR MEDIA FILTRATION (MM-2) SUMMARY OF INDIVIDUAL RUNS

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lb / 1000 gal.	Polymer, lb / 1000 gal.	B.W. solids, lb / 1000 gal.	B.W. vol. as % of treated water[a]	Avg. turb. (Turb. @ time of sample), TU		ORF Fibers x 10^6/l		NWQL Amphibole mg/l		UMD Fibers x 10^6/l		Terminal HL		Run Length, Hrs. (Time to Sample)
									Raw	Filter	Raw	Filter	Raw	Filter	Raw	Filter	Ft. H_2O	Turb. TU	
Filtration w/o sedimentation, dual media, 450 rpm mixer in mixing chamber $FeCl_3$, & polymer added to mixing																			
1	4/19	4.96 (291.00)	$FeCl_3$ 6.22	C-31 0.518	0.052	0.0043	–	–	1.0 (1.3)	0.35 (0.22)	A=.304 C=.217	A=BDL C=.043	0.1	< 0.02			6.2	1.1	14.58 (6.5)
2	4/22	4.5 (264.02)	$FeCl_3$ 6.82	C-31 0.682	0.057	0.0057	–	–	1.3	0.30							6.4	0.82	16.25
3	4/23	4.2 (246.41)	$FeCl_3$ 7.66	C-31 0.725	0.064	0.0061	–	–	1.3	0.64							5.3	0.68	14.25
4	4/24	3.66 (214.73)	$FeCl_3$ 9.91	C-31 0.595	0.083	0.0050	–	–	1.1	0.55							4.3	1.10	10.33
5	4/24	5.48 (321.51)	$FeCl_3$ 10.11	C-31 0.59	0.084	0.0049	–	–	1.0	0.52							3.3	0.95	5.42
6	4/25	4.56 (267.54)	$FeCl_3$ 11.35	C-31 0.486	0.095	0.0041	–	–	1.0	0.25							3.8	0.88	6.75
7	4/25	4.26 (249.93)	$FeCl_3$ 8.61	C-31 0.626	0.072	0.0052	–	–	0.90 (1.0)	0.31 (0.10)	A=.345 C=.174	A=BDL C=.348	0.12	< 0.02			4.4	0.95	15.00 (4.5)
8	4/26	3.89 (228.23)	$FeCl_3$ 11.29	C-31 0.678	0.094	0.0057	–	–	0.90	0.06							2.1	0.15	6.00
9	4/26	4.19 (245.83)	$FeCl_3$ 8.67	C-31 0.64	0.072	0.0053	–	–	0.85	0.28							3.9	0.96	13.08
10	4/26	4.22 (247.59)	$FeCl_3$ 8.53	C-31 0.62	0.071	0.0052	–	–	0.95	0.50							2.9	0.45	7.62
11	4/29	4.18 (245.24)	$FeCl_3$ 7.90	C-31 0.526	0.066	0.0044	–	–	0.85	0.31							4.2	0.87	13.66
12	4/30	4.25 (249.35)	$FeCl_3$ 8.75	C-31 0.583	0.073	0.0049	–	–	0.85	0.27							4.3	0.65	12.10
13	4/30	4.1 (240.55)	$FeCl_3$ 17.21	C-31 0.573	0.144	0.0048	–	–	0.84	0.63							2.4	1.3	4.25
14	Run too short for calculations																		
15	Run too short for calculations																		

APPENDIX C-2 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lb / 1000 gal.	Polymer, lb / 1000 gal.	B.W. solids, lb / 1000 gal.	B.W. vol. as % of treated water[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
16	5/1	4.285 (251.40)	$FeCl_3$ 16.75	C-31 0.492	0.140	0.0041	–	–	0.77	0.39							2.9	1.1	5.92
17	Run too short for calculations.																		
18	Effluent turbidity too high.																		
Polymer added to 2nd floc. chamber.																			
19	5/2	4.2 (246.41)	$FeCl_3$ 11.71	N-17 0.320	0.098	0.0027	–	–	0.80	0.34							6.4	0.33	5.58
Polymer added to 1st floc.chamber.																			
20	5/2	4.21 (247.00)	$FeCl_3$ 11.36	N-17 0.317	0.095	0.0027	–	–	0.60	0.23							6.3	0.64	13.03
Polymer added to 2nd floc. chamber.																			
21	5/3	4.21 (247.00)	$FeCl_3$ 12.21	N-17 0.106	0.102	0.00089	–	–	0.75	0.39							6.8	1.75	11.17
Polymer added to 1st floc. chamber.																			
22	5/3	3.82 (224.12)	$FeCl_3$ 11.48	N-17 0.121	0.096	0.0010	–	–	0.75	0.51							4.0	1.50	10.83
23	5/6	4.24 (248.76)	$FeCl_3$ 11.78	N-17 0.330	0.098	0.0028	–	–	0.70	0.33							6.0	1.5	12.50
Now using Alum as coag. added to mixing chamber.																			
24	5/6	4.25 (249.35)	Alum 16.74	N-17 0.20	0.140	0.0017	–	–	0.70	0.24							6.2	0.70	14.75
25	5/7	3.82 (224.12)	Alum 18.85	N-17 0.269	0.157	0.0022	–	–	0.70	0.12							6.5	0.17	17.0
26	5/8	3.8 (222.95)	Alum 18.54	N-17 0.394	0.155	0.0033	–	–	0.68	0.16							7.0	0.80	16.66
27	5/9	3.67 (215.32)	Alum 19.62	N-17 0.48	0.164	0.0040	–	–	0.80	0.12							7.0	0.11	17.00

APPENDIX C-2 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lb / 1000 gal.	Polymer, lb / 1000 gal.	B.W. solids, lb / 1000 gal.	B.W. vol. as % of treated water[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
28	5/9	3.47 (203.59)	Alum 21.59	985-N 0.968	0.180	0.0081	–	–	0.70	0.11							6.6	0.15	9.66
29	5/10	3.96 (232.33)	Alum 18.93	985-N 0.710	0.158	0.0059	–	–	0.75	0.13							6.6	0.10	8.0
30	5/10	5.28 (309.78)	Alum 10.54	985-N 0.251	0.088	0.0021	–	–	0.65	0.11							6.3	0.09	9.42
31	5/13	3.78 (221.37)	Alum 14.75	985-N 0.148	0.123	0.0012	–	–	0.95	0.49							5.8	1.8	8.95
32	5/13	3.614 (212.03)	Alum 20.0	985-N 0.25	0.167	0.0021	–	–	0.95	0.48							6.1	0.12	8.3
33	5/14	3.75 (220.01)	Alum 18.65	985-N 0.175	0.156	0.0015	–	–	0.80	0.17							7.0	0.15	11.41
34	5/14	3.91 (229.40)	Alum 18.57	N-17 0.133	0.155	0.0011	–	–	2.3	0.24							5.8	0.20	9.63
35	5/15	3.95 (231.75)	Alum 18.5	N-17 0.15	0.154	0.0013	–	–	1.5	0.30							6.8	0.25	12.65
36	5/15	3.52 (206.52)	Alum 20.44	N-17 0.265	0.170	0.0022	–	5.68%[b]	1.3	0.24							7.0	0.11	9.38
37	5/16	3.86 (226.47)	Alum 18.62	N-17 0.24	0.155	0.0020	–	3.46%[b]	1.0 (0.8)	0.19 (0.19)	A=2.61 C=1.35	A=BDL C=.174	0.14	0.003			6.4	0.20	12.16 (9.8)
38	5/16	4.13 (242.31)	Alum 17.46	N-17 0.22	0.146	0.0018	–	4.09%[b]	1.1	0.23							6.3	0.21	11.08
39	5/17	3.876 (227.41)	Alum 19.4	N-17 0.194	0.162	0.0016	–	2.80%[b]	1.0	0.19							6.5	0.11	14.95
40	5/17	3.93 (230.57)	Alum 18.77	N-17 0.156	0.157	0.0013	–	4.59%[b]	1.0	0.20							4.0	0.24	10.15
Polymer fed @ entrance to 1st floc. chamber.																			
41	5/20	3.85 (225.88)	Alum 17.92	N-17 0.132	0.149	0.0011	–	1.80%	0.88	0.20							6.9	0.15	19.57

APPENDIX C-2 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lb / 1000 gal.	Polymer, lb / 1000 gal.	B.W. solids, lb / 1000 gal.	B.W. vol. as % of treated water	Avg. turb. (Turb. @ time of sample), TU Raw	Avg. turb. (Turb. @ time of sample), TU Filter	ORF Fibersx10^6/l Raw	ORF Fibersx10^6/l Filter	NWQL Amphibole mg/l Raw	NWQL Amphibole mg/l Filter	UMD Fibersx10^6/l Raw	UMD Fibersx10^6/l Filter	Terminal HL Ft. H_2O	Terminal HL Turb. TU	Run Length, Hrs. (Time to Sample)
42	5/21	4.03 (236.44)	Alum 19.6	985-N 0.28	0.163	0.0024	0.057	3.79%[b]	0.85	0.17							6.6	0.08	12.00
43	5/22	3.84 (225.29)	Alum 19.09	985-N 0.108	0.159	0.00090	0.025	2.89%[b]	0.88 (0.94)	0.16 (0.15)			0.20	<0.003			6.7	0.15	15.00 (10.0)
44	5/22	3.87 (227.05)	Alum 19.02	985-N 0.116	0.157	0.00097	0.032	2.32%[b]	0.92	0.13							7.0	0.10	13.92
45	5/23	3.71 (217.67)	Alum 19.24	985-N 0.093	0.160	0.00078	0.050	4.14%[b]	1.0	0.14							4.8	0.10	10.83
46	5/23	3.87 (227.05)	Alum 19.1	985-N 0.093	0.159	0.00078	0.110	3.11%[b]	1.3	0.15							6.6	0.05	13.83
47	5/24	3.95 (231.75)	Alum 18.77	985-N 0.074	0.157	0.00061	0.051	1.84%[b]	1.1	0.12							6.9	0.15	17.17
48	5/28	3.88 (227.64)	Alum 18.46	985-N 0.053	0.154	0.00044	0.115	2.72%	0.86	0.23							6.0	1.0	18.13
49	5/29	3.88 (227.64)	Alum 18.85	985-N 0.067	0.157	0.00056	0.083	2.36%	0.85	0.20							5.2	0.83	19.13
50	5/30	4.01 (235.27)	Alum 16.05	985-N 0.054	0.134	0.00045	0.065	2.01%	0.82 (0.80)	0.16 (0.12)	A=1.43 C=1.83	A=BDL C=.913	0.19	0.005			6.8	0.68	23.68 (7.5)
51	5/31	5.09 (298.63)	Alum 10.48	985-N 0.031	0.087	0.00026	0.031	1.77%	0.85	0.44							7.0	0.80	28.08
52	6/3	4.51 (264.60)	Alum 11.1	985-N 0.048	0.093	0.00040	0.031	1.18%	0.79	0.12							6.8	0.10	21.91
53	6/4	4.15 (243.48)	Alum 11.19	985-N 0.053	0.110	0.00045	0.011	1.27%	0.85 (0.86)	0.10 (0.09)	A=1.74 C=29.0	A=BDL C=1.87	0.26	<0.006			6.7	0.05	24.0 (4.7)
54	6/6	1.97 (115.58)	Alum 12.8	985-N 0.052	0.107	0.00043	0.066	1.26%[b]	2.0 (0.74)	0.09 (0.05)	A=1.5 C=2.3	A=0.09 C=0.09	0.18	<0.005			4.3	0.11	67.33 (25.6)
55	6/11	1.86 (109.13)	Alum 13.72	985-N 0.050	0.114	0.00042	0.059	2.19%[b]	3.5 (1.9)	0.15 (0.06)	A=1.0 C=1.6	A=BDL C=2.3	0.18	<0.004			1.2	0.11	33.13 (26.9)
56	6/11	1.97 (115.58)	Alum 12.23	985-N 0.076	0.102	0.00064	0.017	4.25%[b]	2.5	0.18							1.5	0.11	24.91

APPENDIX C-2 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lb / 1000 gal.	Polymer, lb / 1000 gal.	B.W. solids, lb / 1000 gal.	B.W. vol. as % of treated water	Avg. turb. (Turb. @ time of sample), TU Raw	Avg. turb. (Turb. @ time of sample), TU Filter	ORF Fibersx10^6/l Raw	ORF Fibersx10^6/l Filter	NWQL Amphibole mg/l Raw	NWQL Amphibole mg/l Filter	UMD Fibersx10^6/l Raw	UMD Fibersx10^6/l Filter	Terminal HL Ft. H_2O	Terminal HL Turb. TU	Run Length, Hrs. (Time to Sample)
57	6/13	6.31 (370.21)	Alum 11.17	985-N 0.051	0.093	0.00042	0.028	1.48%	2.15 (2.1)	0.3 (0.34)	A=0.48 C=0.41	A=0.15 C=2.02			33.25	0.07	6.7	0.99	15.58 (13.5)
58	6/13	5.33 (312.71)	Alum 13.2	985-N 0.075	0.111	0.00062	0.029	1.52%	1.9	0.10							8.0	0.10	12.90
59	6/14	5.65 (331.49)	Alum 13.6	985-N 0.061	0.113	0.00051	0.080	2.91%	1.95	0.19							8.0	0.09	12.05
60	6/14	6.82 (400.13)	Alum 10.43	985-N 0.042	0.087	0.00035	0.032	1.55%	1.7	0.21							6.6	0.20	9.83
61	6/17	6.77 (397.20)	Alum 10.25	985-N 0.037	0.085	0.00031	0.058	2.11%	0.95 (0.96)	0.20 (0.14)	A=0.61 C=2.15	A=0.04 C=0.37	0.17	< 0.01	10.64	0.41	8.0	0.20	11.57 (4.0)
62	6/18	6.84 (401.30)	Alum 10.033	985-N 0.064	0.084	0.0028	0.095	2.20%	0.95	0.20							8.0	0.35	12.68
63	6/18	6.91 (405.41)	Alum 9.46	985-N 0.089	0.079	0.00074	0.022	1.97%	0.90	0.17							8.0	0.14	11.02
64	6/19	6.86 (402.48)	Alum 9.35	985-N 0.058	0.078	0.00048	0.021	1.46%	0.95	0.18							8.0	0.11	10.80
65	6/19	6.87 (403.06)	Alum 14.98	985-N 0.084	0.125	0.00070	0.053	3.03%	0.89	0.14							8.0	0.10	7.58
66	6/20	7.82 (458.80)	Alum 16.12	985-N 0.082	0.134	0.00068	0.049	3.90%	0.90	0.13							8.0	0.13	6.32
67	6/20	6.82 (400.13)	Alum 12.29	985-N 0.086	0.102	0.00072	0.014	1.80%	0.92	0.13							8.0	0.12	7.47
68	6/20	6.89 (404.24)	Alum 11.86	985-N 0.082	0.099	0.00069	0.034	2.93%	1.1	0.15							8.0	0.17	7.87
69	6/21	7.47 (438.27)	Alum 6.99	985-N 0.058	0.058	0.00049	0.027	1.22%	1.3	0.22							8.0	0.16	10.20
70	6/21	6.78 (397.78)	Alum 8.175	985-N 0.068	0.068	0.00057	0.027	2.14%	1.1	0.20							8.0	0.27	10.64
71	6/24	6.86 (402.48)	Alum 7.10	985-N 0.079	0.059	0.00066	0.042	1.98%	.70 (0.66)	0.16 (0.20)	A=1.0 C=3.9	A=0.02 C=0.98			6.03	0.825	8.0	0.10	12.75 (4.3)

APPENDIX C-2 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lb / 1000 gal.	Polymer, lb / 1000 gal.	B.W. solids, lb / 1000 gal.	B.W. vol. as % of treated water	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibers x 10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibers x 10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
72	6/25	6.17 (361.99)	Alum 15.50	985-N 0.086	0.129	0.00072	0.025	1.80%	0.64	0.12							8.0	0.23	8.63
73	6/25	6.64 (389.57)	Alum 11.81	985-N 0.083	0.098	0.00069	0.031	2.76%	0.66	0.14							8.0	0.27	8.67
74	6/25	6.91 (405.41)	Alum 17.25	985-N 0.050	0.144	0.00041	0.063	3.31%	0.66	0.21							7.2	1.50	8.78
Cloquet water.																			
75	6/26	4.08 (239.37)	Alum 26.48	985-N 0.110	0.221	0.00092	0.066	7.36%[b]	3.48	0.11							1.7	0.25	4.17
1725 r.p.m. mixer in mixing chamber.																			
76	6/28	1.79 (105.02)	Alum 26.89	985-N 0.159	0.224	0.0013	0.029	12.21%[b]	2.9 (2.9)	0.07 (0.06)	A=0.91 C=3.35	A=BDL C=0.52	0.11	<0.005	5.54	0.53	1.5	0.13	9.35 (4.9)
Lakewood water. Tri-Media.																			
77	7/2	3.86 (226.47)	Alum 12.03	985-N 0.048	0.108	0.00040	0.0010	2.01%[b]	0.77	0.10							5.2	0.10	10.75
78	7/3	3.15 (184.81)	Alum 14.66	985-N 0.079	0.122	0.00066	–	2.50%[b]	0.75 0.69)	0.10 (0.12)	A=0.56 A=3.57	A=0.02 C=0.5	0.07	<0.003	2.99	0.16	7.5	0.06	23.73 (3.3)
79	7/4	3.75 (220.01)	Alum 12.09	985-N 0.052	0.101	0.00043	–	2.97%	0.62	0.11							8.0	0.05	20.09
80	7/8	4.06 (238.20)	Alum 11.15	985-N 0.040	0.093	0.00033	–	–	0.67	0.09							8.0	0.09	14.77
81	7/9	4.77 (279.86)	Alum 10.38	985-N 0.032	0.087	0.00027	0.027	4.33%[b]	0.65	0.11							7.4	0.15	10.08
82	Effluent turbidity too high.																		
83	Effluent turbidity too high.																		
84	7/10	4.78 (280.44)	Alum 16.23	985-N 0.042	0.135	0.00035	0.027	2.63%	1.51	0.10							8.0	0.06	11.21

APPENDIX C-2 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lb / 1000 gal.	Polymer, lb / 1000 gal.	B.W. solids, lb / 1000 gal.	B.W. vol. as % of treated water	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU.	Run Length, Hrs. (Time to Sample)
85	7/10	4.85 (284.55)	Alum 14.84	985-N 0.045	0.124	0.00037	0.020	3.60%	0.86	0.09							8.0	0.09	9.91
86	7/11	4.91 (288.07)	Alum 9.52	985-N 0.040	0.070	0.00033	0.027	4.19%	1.9	0.08							8.0	0.07	8.82
87	7/11	4.94 (289.83)	Alum 9.37	985-N 0.045	0.078	0.00038	0.020	4.01%	1.46	0.13							8.0	0.13	9.62
88	7/12	4.86 (285.14)	Alum 9.69	985-N 0.048	0.081	0.00040	0.016	4.41%	1.2	0.12							8.0	0.08	7.97
89	7/12	4.79 (281.03)	Alum 11.26	985-N 0.058	0.094	0.00048	0.019	4.64%	0.88	0.09							8.0	0.11	6.86
90	7/15	4.22 (247.59)	Alum 13.59	985-N 0.059	0.113	0.00050	0.020	4.53%	0.70	0.07							8.0	0.06	8.04
91	7/15	3.23 (189.50)	Alum 16.54	985-N 0.069	0.138	0.00057	0.019	4.66%	0.67	0.06							8.0	0.06	9.60
92	7/16	4.30 (252.28)	Alum 10.82	985-N 0.042	0.090	0.00035	0.020	4.51%	0.67	0.08							8.0	0.05	8.11
55 gal flash mix tanks with one 1725 rpm mixer in each installed ahead of floc. chamber. Alum added to first tank																			
93	7/17	3.70 (217.08)	Alum 12.55	985-N 0.046	0.105	0.00038	0.024	3.58%	0.72	0.07							8.0	0.07	11.92
94	7/18	3.89 (228.23)	Alum 10.20	985-N 0.052	0.085	0.00044	0.033	3.02%	0.76	0.09							8.0	0.09	12.75
95	7/18	4.52 (265.19)	Alum 5.54	985-N 0.042	0.046	0.00035	0.017	2.68%[b]	0.85	0.59							3.7	0.58	13.75
96	7/19	3.75 (220.01)	Alum 6.98	985-N 0.060	0.058	0.00050	0.038	5.39%[b]	0.85 (0.90)	0.31 (0.16)	A=0.52 C=0.35	A=0.02 C=0.04	0.13	<0.005	266.0	0.95	3.1	0.60	7.83 (2.1)
97	7/19	3.51 (205.93)	Alum 9.08	985-N 0.060	0.076	0.00050	0.026	3.56%[b]	0.70	0.29							4.7	0.19	13.33
98	7/22	3.68 (215.91)	Alum 10.72	985-N 0.036	0.089	0.00030	0.019	2.38%	0.62	0.08							8.0	0.12	16.74

APPENDIX C-2 (CONTINUED)

Run No.	Date	Filter rate gpm/ft² (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lbs./1000 gal.	Polymer, lbs./1000 gal.	B.W. solids, lbs/1000 gal.	B.W. vol. as % of treated water	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
99	7/23	4.41 (258.74)	Alum 8.77	985-N 0.029	0.073	0.00025	0.023	1.96%	0.60 (0.57)	0.12 (0.11)	A=0.54 C=0.09	A=BDL C=0.20	0.09	<0.004	26.0	0.23	8.0	0.09	17.95 (7.9)
100	7/24	4.23 (248.71)	Alum 10.80	985-N 0.031	0.090	0.00026	0.057	2.05%	0.75	0.09							8.0	0.08	18.25
101	7/25	4.55 (266.95)	Alum 9.99	985-N 0.013	0.083	0.00011	0.033	2.30%	0.75 (0.66)	0.14 (0.09)	A=0.11 C=1.43	A=BDL C=0.15	0.04	<0.005	60.5	0.43	8.0	0.10	14.68 (13.1)
102	7/25	4.43 (259.91)	Alum 10.84	985-N 0.0014	0.090	0.000012	0.069	1.90%	0.73	0.13							4.5	0.36	19.75
103	7/26	1.32 (253.45)	Alum 10.89	985-N 0.0076	0.091	0.000063	0.014	2.03%	0.60	0.13							4.8	0.45	19.00
104	7/30	4.32 (253.45)	Alum 11.00	985-N 0.0016	0.092	0.000013	0.023	2.16%	0.73 (0.76)	0.15 (0.40)					0.10	0.02	3.4	0.40	17.87 (17.7)
105	7/30	4.41 (258.74)	Alum 10.97	985-N 0.029	0.091	0.00024	0.018	1.46%	0.75 (0.69)	0.10 (0.09)	A=0.11 C=0.11	A=BDL C=BDL	0.06	<0.005	26.6	0.10	5.5	0.36	25.83 (4.3)
Cloquet water																			
106	7/31	4.17 (244.65)	Alum 20.97	985-N 0.122	0.175	0.0010	0.018	10.00%[b]	3.68 (4.00)	0.06 (0.06)	A=0.33 C=0.22	A=BDL C=BDL	0.10	<0.003	106.6	0.64	2.2	0.05	4.00 (2.4)
Lakewood water																			
107	8/1	3.20 (187.74)	Alum 16.19	985-N 0.040	0.135	0.00033	0.041	1.69%	0.90 (0.87)	0.08 (0.08)	A=0.22 C=0.15	A=BDL C=BDL	0.08	<0.003	30.0	0.14	5.0	0.35	30.83 (17.9)
108	8/2	4.01 (235.27)	Alum 13.11	985-N 0.032	0.109	0.00026	0.032	1.59%	1.11	0.08							8.0	0.07	24.63
109	8/6	3.38 (198.31)	Alum 15.10	985-N 0.043	0.129	0.00036	0.069	1.19%	0.62 (0.58)	0.10 (0.06)	A=0.6 C=0.3	A=BDL C=BDL	0.09	<0.003	10.2	0.19	8.0	0.17	34.26 (23.5)
110	8/7	4.07 (238.79)	Alum 13.63	985-N 0.031	0.114	0.00026	0.067	1.59%	0.66	0.12							5.1	0.48	22.50
111	8/8	4.47 (232.26)	Alum 11.73	985-N 0.034	0.098	0.00028	0.019	1.40%	0.92 (0.68)	0.11 (0.08)	A=0.06 C=0.09	A=BDL C=0.09	0.05	<0.003	15.1	0.16	8.0	0.12	25.55 (9.9)

APPENDIX C-2 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lbs. / 1000 gal.	Polymer, lbs. / 1000 gal.	B.W. solids, lbs / 1000 gal.	B.W. vol. as % of treated water	Avg. turb. (Turb. @ time of sample), TU Raw	Avg. turb. (Turb. @ time of sample), TU Filter	ORF Fibers x 10^6/l Raw	ORF Fibers x 10^6/l Filter	NWQL Amphibole mg/l Raw	NWQL Amphibole mg/l Filter	UMD Fibers x 10^6/l Raw	UMD Fibers x 10^6/l Filter	Terminal Hl. Ft. H_2O	Terminal Hl. Turb. TU	Run Length, Hrs. (Time to Sample)
112	8/9	4.18 (245.24)	Alum 12.76	985-N 0.041	0.106	0.00034	0.026	1.80%	1.23	0.18							8.0	0.15	20.51
113	8/13	3.88 (227.64)	Alum 15.30	985-N 0.041	0.128	0.00034	0.032	1.82%	0.64 (0.60)	0.07 (0.06)	A=0.13 C=0.2	A=BDL C=1.4	0.06	<0.003	20.0	0.37	8.0	0.06	22.55 (22.3)
114	8/15	1.97 (115.58)	Alum 18.93	985-N 0.042	0.158	0.00035	0.078	1.37%	0.65 (0.71)	0.05 (0.04)	A=0.09 C=0.17	A=0.02 C=0.22	0.06	<0.003	8.98	0.43	8.0	0.04	58.63 (45.7)
115	8/16	4.25 (249.35)	Alum 14.67	985-N 0.030	0.122	0.00025	0.095	1.58%	0.77	0.09							8.0	0.35	22.68
Alum and anionic polymer added to first tank, cationic polymer added to second tank.																			
116	8/19	3.88 (227.64)	Alum 15.32	A-23 0.385 Catfloc B 0.602	0.128	0.00032 0.0050	0.090	2.23%	0.57	0.07							3.5	0.39	19.25
Alum added to first tank, cationic polymer added to second tank.																			
117	8/19	3.95 (231.75)	Alum 16.08	Catfloc B 0.533	0.134	0.0044	0.073	2.22%	0.71	0.06							1.7	0.23	14.25
Alum and anionic polymer added to first tank, cationic or nonionic polymer added to second tank.																			
118	8/20	4.01 (235.27)	Alum 15.43	A-23 0.648 Catfloc B 0.562	0.129	0.0054 0.0047	0.130	2.06%	0.82 (0.84)	0.11 (0.08)	A=0.30 C=0.72	A=0.02 C=2.1	0.02	<0.003	25.3	0.15	7.4	0.20	20.17 (1.9)
119	8/23	4.24 (248.76)	Alum 14.24	A-23 0.281 985-N 0.042	0.119	0.0023 0.00035	0.124	1.70%	0.59 (0.63)	0.08 (0.08)	A=0.72 C=0.44	A=BDL C=0.28	0.04	<0.003	17.0	0.26	8.0	0.06	21.83 (18.5)
120	8/23	3.75 (220.01)	Alum 12.90	A-23 0.311 985-N 0.044	0.108	0.0026 0.00037	0.018	5.12%[b]	0.53	0.09							1.4	0.11	8.67

APPENDIX C-2 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lbs. / 1000 gal.	Polymer, lbs. / 1000 gal.	B.W. solids, lbs / 1000 gal.	B.W. vol. as % of treated water	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
3 In-Line Kinecs mixers installed, Alum added ahead of first mixer, polymer added ahead of second mixer.																			
121	8/27	4.32 (253.45)	Alum 10.13	985-N 0.041	0.084	0.00035	0.025	1.74%	0.46	0.07	A						5.5	0.32	20.57
122	8/28	4.33 (254.04)	Alum 11.58	985-N 0.049	0.097	0.00040	0.031	1.69%	0.47 (0.43)	0.06 (0.04)	A=0.39 C=0.48	A=BDL C=0.04	0.09	< 0.003	10.4	0.11	6.2	0.30	19.92 (3.7)
123	8/29	3.79 (222.36)	Alum 13.13	985-N 0.065	0.110	0.00055	0.034	1.55%	0.50	0.06							5.8	0.33	24.22
Anionic polymer added ahead of first mixer, Alum added ahead of second mixer, nonionic or cationic polymer a																			
124	8/30	3.92 (229.99)	Alum 14.93	A-23 0.160 985-N 0.064	0.125	0.0013 0.00053	0.044	1.63%	0.69 (0.39)	0.07 (0.05)	A=0.75 C=0.33	A=0.02 C=0.30	0.07	<0.003	17.8	0.18	4.8	0.34	19.55 (3.7)
125	9/3	4.14 (242.89)	Alum 13.92	C-31 0.437 A-23 0.133	0.116	0.0036 0.0011	0.052	2.16%	0.62	0.09							3.2	1.0	16.28
126	9/4	4.00 (234.68)	Alum 16.95	C-31 0.567 A-23 0.158	0.141	0.0047 0.0013	0.107	2.92%	0.66 (0.7)	0.08 (0.06)	A=1.61 C=0.3	A=BDL C=BDL	0.10	<0.003	30.3	0.33	2.8	0.65	17.82 (9.6)
127	9/5	4.33 (254.04)	Alum 13.86	985-N 0.040 A-23 0.149	0.116	0.00034 0.0012	0.011	2.63%	0.68	0.08							3.3	0.34	14.33
128	9/6	4.12 (241.72)	Alum 13.38	985-N 0.060 A-23 0.124	0.112	0.00050 0.0010	0.017	2.39%	0.51 (0.51)	0.08 (0.10)	A=0.72 C=0.39 A=1.449 C=0.289	A-BDL C=0.37 EPA Cincinnati A=0.036 C=0.108	0.07	<0.003	13.6	0.17	8.0	0.39	21.00 (8.7)
Alum added ahead of first mixer, polymer added ahead of second mixer.																			
129	9/9	6.16 (361.41)	Alum 15.59	985-N 0.051	0.130	0.00042	0.039	2.08%	0.51	0.09							7.8	0.58	13.00

APPENDIX C-2 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag., lbs. / 1000 gal.	Polymer, lbs. / 1000 gal.	B.W. solids, lbs / 1000 gal.	B.W. vol. as % of treated water	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
130	9/10	6.09 (357.30)	Alum 12.56	985-N 0.085	0.105	0.00071	0.050	2.40%	0.51	0.07							8.0	0.08	11.06
131	9/10	6.18 (362.58)	Alum 13.36	985-N 0.053	0.111	0.00044	0.031	2.35%	0.58 (0.64)	0.07 (0.06)	A=0.6 C=0.5	A=BDL C=0.5	0.05	<0.003		0.27	8.0	0.23	10.05 (2.8)
132	9/11	5.97 (350.26)	Alum 24.17	985-N 0.051	.202	0.00042	0.037	2.64%[b]	0.83	0.11							5.2	0.20	9.25)
133	9/11	5.98 (350.85)	Alum 24.56	985-N 0.077	0.205	0.00065	0.034	3.85%	0.60 (0.45)	0.16 (0.07)	A=0.3 C=0.3	A=0.02 C=0.3	0.06	<0.003	13.0	0.30	4.6	0.43	7.40 (4.3)
34	9/11	4.12 (241.72)	Alum 16.63	C-31 0.586	0.139	0.0049	0.061	3.21%	0.47	0.07							3.1	9.0	12.62
3 additional In-Line Kinecs mixers installed, Alum added ahead of first pair, polymer added ahead of second pair																			
135	9/12	4.02 (235.85)	Alum 18.97	C-31 0.628	0.158	0.0053	0.061	4.62%	0.42	0.07							2.8	0.25	8.97
136	9/13	4.05 (237.61)	Alum 37.86	C-31 0.793	0.316	0.0066	0.086	7.89%	0.47	0.06							2.1	0.55	5.22
137	9/13	3.98 (233.51)	Alum 19.66	C-31 0.790	0.164	0.0066	0.051	4.92%	0.44 (0.40)	0.07 (0.05)	A=0.02 C=0.06	A=0.02 C=0.1	0.09	<0.003	30.0	0.24	2.6	0.21	9.6 (5.3)
55 gal. flash mix tanks installed, Alum and anionic polymer added to first tank, cationic or nonionic polymer ad																			
138	9/16	4.29 (251.69)	Alum 14.62	985-N 0.065 / A-23 0.126	0.122	0.00054 / 0.0010	0.028	1.61%	0.42 (0.37)	0.06 (0.04)	A=0.9 C=0.1	A=0.02 C=0.3	0.08	<0.003	20.3	0.51	8.0	0.06	21.84 (1.9)
139	9/17	4.35 (255.21)	Alum 14.70	C-31 0.622 / A-23 0.123	0.123	0.0052 / 0.0010	0.022	2.01%	0.51 (0.47)	0.07 (0.05)	A=0.2 C=0.1	A=BDL C=0.1	0.06	<0.003	12.8	0.64	6.8	0.24	21.41 (1.5)

APPENDIX C-2 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Coag., mg/l	Polymer, mg/l	Coag. lbs. / 1000 gal.	Polymer, lbs. / 1000 gal.	B.W. solids, lbs / 1000 gal.	B.W. vol. as % of treated water	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibers x 10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibers x 10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
Sedimentation tube settlers installed. Alum added to first tank, polymer added to second tank.																			
140	9/19	3.85 (225.88)	Alum 14.02	985-N 0.066	0.117	0.00055	From Sed. 0.0065 From B.W. 0.014 Total Solids 0.020	1.45%	0.47 (0.52)	0.06 (0.06)	A=0.6 C=0.09	A=BDL C=0.3	0.10	0.003	13.8	0.33	8.0	0.10	31.98 (1.8)

[a] B.W. volume was not measured in Runs 1-35.

[b] Runs did not reach terminal H_L or turbidity.

[c] A=amphibole, C=chrysotile

APPENDIX C-3 VACUUM DIATOMACEOUS EARTH FILTRATION (DIF) SUMMARY OF INDIVIDUAL RUNS

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	TU Filter	ORF Fibers x 10^6/l Raw	ORF Fibers x 10^6/l Filter	NWQL Amphibole mg/l Raw	NWQL Amphibole mg/l Filter	UMD Fibers x 10^6/l Raw	UMD Fibers x 10^6/l Filter	Terminal HL Ft. H_2O	Terminal HL Turb. TU	Run Length, Hrs. (Time to Sample)
One step precoat, E.P. FW-50 to precoat, J.M Celite 512 to body feed.																					
1-T	4/24	0.843 (49.46)	FW-50 0.1	0.055	–	–		89.09	512 0.743	0.798	0.98	0.61							16.9	0.45	36.00
J.M. Celite 512 to precoat.																					
2-T	4/26	0.913 (53.57)	512 0.1	0.059	–	–		82.30	512 0.686	0.746	0.85	0.65							15.3	2.5	30.75
E.P. FW-50 to precoat.																					
3-T	4/29	1.015 (59.55)	FW-50 0.1	0.071	–	–		73.99	512 0.617	0.688	0.81	0.65							16.2	0.83	23.08
4-T	4/30	0.895 (52.51)	FW-50 0.1	0.061	–	–		67.01	512 0.559	0.620	0.79	0.33							17.0	0.33	30.50
J.M. Hyflo Super Cel to precoat.																					
5-T	5/2	0.915 (53.68)	Super Cel 0.15	0.082	–	–		65.54	512 0.547	0.628	0.65	0.18							16.4	0.15	33.50
6-T	Run failed due to high HL.																				
7-T	Run failed due to high HL.																				
J.M. Hyflo Super Cel & anionic polymer to precoat.																					
8-T	5/3	0.927 (54.39)	Super Cel 0.1	0.093	A-23 0.00005	A-23 4.67×10^{-6}		64.68	512 0.539	0.633	0.69	0.16							11.6	0.15	19.50
J.M. Celite 512 & anionic polymer to precoat																					
9-T	5/6	1.019 (59.785)	512 0.1	0.084	A-23 0.00003	A-23 2.51×10^{-6}		48.05	512 0.401	0.485	0.69	0.19							16.8	0.18	19.50
10-T	5/7	1.035 (60.72)	512 0.1	0.070	A-23 0.00003	A-23 2.1×10^{-6}		57.90	512 0.483	0.553	0.72 (0.76)	0.19 (0.18)	A=0.522 C=0.130	A=BDL C=1.43	0.06	≤ 0.01			16.3	0.24	22.92 (2.2)
Dicalite Speed flow & anionic polymer to precoat																					
11-T	5/8	1.065 (62.48)	Speed flow 0.1	0.104	A-23 0.00003	A-23 3.13×10^{-6}		56.27	512 0.469	0.574	0.68	0.15							16.8	0.12	15.00

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft² (m^3/m^2 day)	Precoat, lbs./ft²	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibers x 10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibers x 10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
12-1	5/9	0.979 (57.44)	Speed flow 0.15	0.138	A-23 0.00003	A-23 4.1×10^{-6}		61.25	512 0.511	0.649	0.85 (0.65)	0.15 (0.14)	A=0.870 C=1.78	A=BDL C=BDL	0.22	0.003			16.7	0.10	18.47 (14.5)
13-1	5/9	0.983 (57.67)	Speed flow 0.15	0.199	A-23 0.00003	A-23 5.96×10^{-6}		60.72	512 0.506	0.705	0.75	0.16							10.1	0.18	12.83
14-1	5/10	1.012 (59.37)	Speed flow 0.15	0.127	A-23 0.00003	A-23 3.8×10^{-6}		59.25	512 0.494	0.621	0.70	0.18							15.0	0.23	19.50
Nonionic polymer to precoat. Dicalite Speedflow to body feed.																					
1	5/13	1.17 (68.64)	Speed flow 0.15	0.227	985-N 0.00003	985-N 6.797×10^{-6}		49.7	Speedflow 0.414	0.641	0.92	0.35							16.8	0.45	9.42
Anionic polymer to precoat.																					
2	5/13	0.954 (55.97)	Speed flow 0.15	0.520	A-23 0.00003	A-23 1.561×10^{-5}		59.3	Speedflow 0.524	1.044	0.96	0.23							17.0	0.18	4.73
3	5/14	1.057 (62.01)	Speed flow 0.15	0.728	A-23 0.00003	A-23 2.183×10^{-5}		56.71	Speedflow 0.473	1.201	0.90	0.20							17.0	0.23	3.25
4	5/14	1.007 (59.08)	Speed flow 0.15	0.406	A-23 0.00003	A-23 1.217×10^{-5}		59.51	Speedflow 0.496	0.902	0.74	0.22							17.0	0.22	6.12
E.P. FW-6 & Dicalite Speedflow & anionic polymer to precoat. E.P. FW-6 to body feed.																					
5	5/14	1.056 (61.96)	FW-6 0.1	0.557	A-23 0.00003	A-23 2.5×10^{-5}		56.75	FW-6 0.473	1.309	0.84	0.28							16.7	0.40	2.83
			Speed flow 0.05	0.278																	

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[3]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibers x 10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibers x 10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
E.P. FW-6 to precoat.																					
6	5/14	0.988 (57.97)	FW-6 0.15	0.258				60.7	FW-6 0.506	0.764	2.2	0.60							12.3	1.25	9.80
E.P. FW-50 & E.P. FW-6 to precoat.																					
7	5/15	0.968 (56.79)	FW-50 0.1	0.085				61.93	FW-6 0.517	0.644	1.3	0.3							16.0	0.30	20.25
			FW-6 0.05	0.043																	
E.P. FW-50 & E.P. FW-6 & anionic polymer to precoat.																					
8	5/16	0.948 (55.62)	FW-50 0.1	0.079	A-23 0.00003	A-23 1.18×10^{-6}		66.05	FW-6 0.550	0.668	0.95 (0.80)	0.22 (0.18)	A=2.61 C=1.35	A=0.565 C=0.652	0.14	0.006			17.0	0.26	23.05 (12.0)
			FW-6 0.05	0.039																	
Cationic polymer to precoat.																					
9	5/17	0.948 (55.62)	FW-50 0.1	0.061	C-31 0.00005	C-31 4.6×10^{-6}		63.27	FW-6 0.528	0.620	0.90	0.30							16.0	0.35	28.67
			FW-6 0.05	0.031																	
E.P. FW-50 & J.M. Celite 512 & cationic polymer to precoat, J.M. Celite 512 to body feed.																					
10	5/20	0.864 (50.69)	FW-50 0.1	0.060	C-31 0.0005	C-31 4.47×10^{-5}		69.4	512 0.579	0.668	0.93	0.275							17.0	0.23	31.61
			512 0.05	0.030																	
J.M. Hyflo Super Cel & J.M. Celite 512 & cationic polymer to precoat.																					
11	5/22	0.953 (55.91)	Super Cel 0.1	0.062	C-31 0.0006	C-31 5.6×10^{-5}		45.24	512 0.377	0.471	0.88 (0.94)	0.30 (0.36)			0.2	< 0.03			16.9	0.20	28.05 (15.3)
			512 0.05	0.031																	

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs./1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs./1000 gal.	Other chem. in precoat, lbs./1000 gal.	Body feed, mg/l	Body feed, lb./1000 gal.	B.W. solids, lbs./100 gal. (B.W. vol. as % of treated water)[3]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibers Raw	Fi	NWQL Amphibole mg/l Raw	Filter	UMD Fibers x 10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
J.M. Celite 512 & Dicalite Speedflow & cationic polymer to precoat.																					
12	5/22	0.904 (53.04)	512 0.1	0.099	C-31 0.0006	C-31 8.88×10^{-5}		82.26	512 0.686	0.834	0.93	0.30							11.9	1.6	18.67
			Speed Flow 0.05	0.049																	
Dicalite Speedflow & J.M. Celite 512 & cationic polymer to precoat.																					
13	5/23	0.895 (52.51)	Speed flow 0.1	0.070	573-C 0.0006	573-C 6.32×10^{-5}		93.3	512 0.778	0.884	0.98	0.30							17.0	0.35	26.50
			512 0.05	0.035																	
Dicalite Speedflow & E.P. FW-60 & cationic polymer to precoat.																					
14	5/24	0.945 (55.44)	Speed flow 0.1	0.184	C-31 0.0005	C-31 0.00014		84.55	512 0.705	0.981	1.25	0.35							5.6	0.40	9.58
			FW-60 0.05	0.092																	
E.P. FW-50 & E.P. FW-2 & cationic polymer to precoat.																					
15	5/28	0.877 (51.45)	FW-50 0.05	0.078	573-C 0.0008	573-C 0.00017		52.42	512 0.437	0.670	0.83	0.75							16.9	0.56	12.25
			FW-2 0.1	0.155																	
16	5/28	0.844 (49.52)	FW-50 0.1	0.113	573-C 0.0005	573-C 8.46×10^{-5}		162.58	512 1.356	1.525	0.9	0.35							16.2	0.33	17.50
			FW-2 0.05	0.056																	
J.M. Celite 512 & Dicalite Speedflow & cationic polymer to precoat, E.P. FW-12 to body feed.																					
17	5/30	0.843 (49.46)	512 0.1	0.074	573-C 0.0007	573-C 5.57×10^{-5}		183.7	FW-12 1.532	1.644	0.82 (0.80)	0.23 (0.33)	A=1.43 C=1.83	A=0.739 C=1.83	0.19	< 0.02			16.9	0.23	26.58
			Speedflow 0.05	0.037																	

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibers x 10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibers x 10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
Two step precoat, J.M. Celite 503 & cationic polymer to first step, Dicalite Speedflow & cationic polymer to second step.																					
18	5/30	0.834 (48.93)	503 0.1	0.056	573-C 0.0005	573-C 4.78×10^{-5}		62.4	FW-12 0.520	0.605	0.85	0.2							9.0	0.24	35.50
			Speed flow 0.05	0.028	573-C 0.0007																
19	6/4	0.807 (47.35)	503 0.1	0.047	573-C 0.0005	573-C 4.03×10^{-5}		109.86	FW-12 0.916	0.988	0.8 (0.86)	0.15 (0.15)	A=1.74 C=2.91	A=0.217 C=0.087	0.26	0.004			16.8	0.15	43.50 (28.1)
			Speed flow 0.05	0.024	573-C 0.0007																
Dicalite Speedflow to body feed.																					
20	6/6	0.871 (51.10)	503 0.1	0.043	573-C 0.0005	573-C 3.66×10^{-5}		168.46	Speedflow 1.405	1.470	0.8 (0.74)	0.20 (0.20)	A=1.5 C=2.3	A=0.08 C=0.7	0.18	0.004			17.0	0.60	44.33 (31.4)
			Speed flow 0.05	0.022	573-C 0.0007																
21	6/7	0.918 (53.86)	503 0.1	0.071	573-C 0.0005	573-C 6.03×10^{-5}		297.93	Speedflow 2.485	2.591	3.8	0.40							17.0	0.31	25.58
			Speed flow 0.05	0.035	573-C 0.0007																
22	6/10	0.900 (52.80)	503 0.1	0.144	573-C 0.00005	573-C 1.08×10^{-5}		86.05	Speedflow 0.718	0.934	4.5	0.70							17.0	0.50	12.83
			Speed flow 0.05	0.072																	
23	6/11	0.853 (50.05)	503 0.1	0.221	573-C 0.0005	573-C 0.00017		149.8	Speedflow 1.249	1.581	4.0	0.67							17.0	0.54	8.75
			Speed flow 0.05	0.110																	

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[3]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
24	6/11	0.879 (51.57)	503 0.1	0.270	573-C 0.0005	573-C 0.00020		247.37	Speedflow 2.063	2.468	1.9 (1.9)	0.45 (0.50)	A=1.0 C=1.6	A=0.02 C=0.26	0.18	0.008			16.8	0.26	7.03 (2.3)
			Speed flow 0.05	0.135																	
J.M. Celite 545 & cationic polymer to first step of precoat, J.M. Hyflo Super Cel & cationic polymer to second step of precoat, J.M.																					
25	6/11	0.855 (50.16)	545 0.1	0.088	573-C 0.0005	573-C $3.82x10^{-5}$		312.2	Super Cel 2.604	2.780	3.0	0.90							17.0	0.60	22.08
			Super Cel 0.1	0.088																	
J.M. Celite 503 & cationic polymer to first step of precoat, J.M. Hyflo Super Cel & cationic polymer to second step of precoat.																					
26	6/12	0.969 (56.85)	503 0.1	0.133	573-C 0.0005	573-C 0.00017		264.8	Super Cel 2.208	2.540	2.2	0.45							15.4	0.40	12.97
			Super Cel 0.15	0.199																	
27	Run was terminated due to poor quality effluent.																				
E.P. FW-50 & cationic polymer to first step of precoat, J.M. Celite 503 & cationic polymer to second step of precoat, J.M. Celite 503																					
28	6/13	0.899 (52.74)	FW-50 0.1	0.108	573-C 0.0005	573-C 0.00011		371.87	503 3.101	3.318	2.0 (2.1)	0.5 (0.68)	A=0.48 C=0.41	A=0.8 C=0.46					5.9	0.55	17.10
			503 0.1	0.108																	
J.M. Celite 503 & cationic polymer to first step of precoat, E.P. FW-2 & cationic polymer to second step of precoat.																					
29	6/14	0.867 (50.87)	503 0.15	0.228	573-C 0.0007	573-C 0.00012		378.26	503 3.155	3.458	1.9	0.3							16.4	0.37	12.67
			FW-2 0.05	0.076																	
Dicalite Speedflow & cationic polymer to second step of precoat, Dicalite Speedflow to body feed.																					
30	6/15	0.982 (57.61)	503 0.1	0.242	573-C 0.0007	573-C 0.00034		53.17	Speedflow 0.443	0.928	1.7	0.3							11.1	0.30	7.00
			Speedflow 0.1	0.242																	

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[3]	Avg. turb. (Turb. @ time of sample), TU Raw	TU Filter	ORF Fibers x 10^6/l Raw	ORF Fibers x 10^6/l Filter	NWQL Amphibole mg/l Raw	NWQL Amphibole mg/l Filter	UMD Fibers x 10^6/l Raw	UMD Fibers x 10^6/l Filter	Terminal HL Ft. H_2O	Terminal HL Turb. TU	Run Length, Hrs. (Time to Sample)
J.M. Celite 512 & cationic polymer to first step of precoat.																					
31	6/17	0.868 (50.93)	512 0.1	0.137	573-C 0.0007	573-C 0.00019		147.0	Speedflow 1.226	1.500	0.95 (0.96)	0.27 (0.65)	A=0.61 C=2.15	A=0.09 C=0.39	0.17	< 0.03	10.64	7.59	17.0	0.26	14.00 (4.3)
			Speed flow 0.1	0.137																	
J.M. Celite 503 & cationic polymer to first step of precoat, E.P. FW-6 & cationic polymer to second step of precoat, E.P. FW-6 to be																					
32	6/18	0.842 (49.40)	503 0.1	0.089	573-C 0.0007	573-C 0.00013		201.91	FW-6 1.684	1.863	0.92	0.20							16.8	0.18	22.20
			FW-6 0.1	0.089																	
33	6/18	0.917 (53.80)	503 0.1	0.111	573-C 0.0007	573-C 0.00016		72.47	FW-6 0.605	0.827	0.92	0.20							10.7	0.15	16.37
			FW-6 0.1	0.111																	
34	6/19	0.984 (57.73)	503 0.1	0.067	573-C 0.0007	573-C 0.00009		52.79	FW-6 0.440	0.574	0.9	0.25							13.4	0.15	25.40
			FW-6 0.1	0.067																	
35	6/20	0.903 (52.98)	503 0.1	0.121	573-C 0.0007	573-C 0.00017		123.20	FW-6 1.028	1.269	1.2	0.25							12.8	0.21	15.32
			FW-6 0.1	0.121																	
Anionic polymer used in place of cationic polymer.																					
36	6/21	0.943 (55.33)	503 0.1	0.084	A-23 0.00002	A-23 3.0×10^{-6}		54.26	FW-6 0.453	0.621	1.2	0.20							13.6	0.18	20.97
			FW-6 0.1	0.084																	
37	6/24	0.866 (50.81)	503 0.1	0.174	A-23 0.00002	A-23 7.0×10^{-6}		69.25	FW-6 0.577	0.926	0.7 (0.66)	0.15 (0.20)	A=1.0 C=3.9	A=BDL C=0.2			6.03	8.17	10.5	0.13	11.05 (5.0)
			FW-6 0.1	0.174																	

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
38	6/24	0.953 (55.91)	503 0.1	0.136	A-23 0.00002	A-23 $5x10^{-6}$		94.79	FW-6 0.790	1.061	0.66	0.15							12.5	0.14	12.45
			FW-6 0.1	0.136																	
39	6/25	0.857 (50.28)	503 0.1	0.169	A-23 0.00002	A-23 $6.8x10^{-6}$		151.73	FW-6 1.265	1.603	0.67	0.15							14.5	0.10	11.5
			FW-6 0.1	0.169																	
40	6/25	0.874 (51.28)	503 0.1	0.291	A-23 0.00002	A-23 $1.2x10^{-5}$		308.17	FW-6 2.570	3.152	0.65	0.12							17.0	0.17	5.83
			FW-6 0.1	0.291																	
41	6/26	0.938 (55.03)	503 0.1	0.402	A-23 0.00002	A-23 $2x10^{-5}$		341.3	FW-6 2.846	3.650	0.65	0.11							16.4	0.09	4.42
			FW-6 0.1	0.402																	
Alum used in place of anionic polymer, J.M. Celite 512 to body feed.																					
42	6/26	0.839 (49.22)	503 0.1	0.125	Alum 0.01	Alum 0.0025		45.03	512 0.376	0.625	0.68	0.12							17.0	0.11	15.92
			FW-6 0.1	0.125																	
43	Run terminated due to inadequate precoat.																				
44	Run terminated due to inadequate precoat.																				
45	Run terminated due to inadequate precoat.																				
J.M. Celite 503 to first step of precoat, JM. Hyflo Super Cel & Alum to second step of precoat, J.M. Hyflo Super Cel to body feed.																					
46	6/27	0.904 (53.04)	503 0.1	0.138	Alum 0.02	Alum 0.0028		41.50	Super Cel 0.346	0.628	0.65	0.30							6.9	0.50	13.33
			Super Cel 0.1	0.138																	

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs / 1000 gal	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	TU Filter	ORI Fibersx10^6/l Raw	ORI Fibersx10^6/l Filter	NWQL Amphibole mg/l Raw	NWQL Amphibole mg/l Filter	UMD Fibersx10^6/l Raw	UMD Fibersx10^6/l Filter	Terminal HL Ft. H_2O	Terminal HL Turb. TU	Run Length, Hrs. (Time to Sample)
E.P. FW-6 & Alum to second step of precoat.																					
47	6/28	0.870 (51.04)	503 0.1	0.106	Alum 0.02	Alum 0.0021		44.03	Super Cel 0.367	0.582	0.67 (0.64)	0.30 (0.17)	A=1.11 C=8.12	A=0.15 C=6.03	0.16	< 0.008	5.54	0.83	8.5	0.34	18.05 (0.8)
			FW-6 0.1	0.106																	
48	No run conducted.																				
J.M. Hyflo Super Cel to first step of precoat.																					
49	7/1	0.905 (53.10)	Super Ce 0.1	0.053	Alum 0.02	Alum 0.0011		42.61	Super Cel 0.355	0.463	0.8	0.30							11.3	0.35	34.55
			FW-6 0.1	0.053																	
50	7/2	0.992 (58.20)	Super Ce 0.1	0.164	Alum 0.02	Alum 0.0033		70.17	Super Cel 0.585	0.919	0.80	0.30							8.5	0.58	10.25
			FW-6 0.1	0.164																	
51	7/3	0.916 (53.74)	Super Cel 0.1	0.264	Alum 0.02	Alum 0.0053		72.62	Super Cel 0.606	1.139	0.68 (0.69)	0.27 (0.31)	A=0.56 C=3.57	A=0.20 C=1.67	0.07	< 0.004	2.99	1.96	7.5	0.24	6.88 (2.6)
			FW-6 0.1	0.264																	
E.P. FW-50 to first step of precoat. J.M. Celite 512 & Alum to second step of precoat.																					
52	7/3	0.929 (54.50)	FW-50 0.1	0.046	Alum 0.03	Alum 0.0014		54.89	Super Cel 0.458	0.551	0.68	0.25							15.2	0.30	38.83
			512 0.1	0.046																	
53	7/8	1.019 (59.79)	FW-50 0.1	0.160	Al^{+++} 0.01	Alum 0.018		47.66	Super Cel 0.398	0.735	0.68	0.31							9.3	0.30	10.25
			512 0.1	0.160																	

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
J.M. Celite 545 to first step of precoat, J.M. Celite 512 to body feed.																					
54	7/8	0.911 (53.45)	545 0.1	0.066	Al+++ 0.01	Alum 0.0073		46.94	512 0.391	0.531	0.74	0.24							16.88	0.25	27.73
			512 0.1	0.066																	
55	7/10	0.965 (56.62)	545 0.1	0.189		Alum 0.01	Alum 0.0019	71.14	512 0.593	0.973	1.02	0.35							16.0	0.41	9.13
			512 0.1	0.189																	
56	7/10	0.936 (54.92)	545 0.1	0.129	Al+++ 0.01	Alum 0.014		67.43	512 0.562	0.834	1.31	0.37							16.7	0.29	13.83
			512 0.1	0.129																	
E.P. FW-50 to first step of precoat.																					
57	7/11	0.969 (56.85)	FW-50 0.1	0.099	Al+++ 0.005	Alum 0.0055		48.23	512 0.402	0.606	1.25	0.23							16.4	0.31	17.33
			512 0.1	0.099																	
Soda Ash also added to second step of precoat.																					
58	7/11	0.871 (51.10)	FW-50 0.1	0.103	Al+++ 0.005	Alum 0.0057	Soda Ash 0.0059	50.63	512 0.422	0.635	1.52	0.33							14.8	0.33	18.50
			512 0.1	0.103																	
59	7/12	0.951 (55.80)	FW-50 0.1	0.215	Al+++ 0.01	Alum 0.024	Soda Ash 0.025	44.72	512 0.373	0.850	0.99	0.27							17.0	0.24	8.17
			512 0.1	0.215																	

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs./1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs/1000 gal.	Other chem. in precoat, lbs/1000 gal.	Body feed, mg/l	Bdy feed, lb./1000 gal.	B.W. solids, lbs/1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
J.M. Hyflo Super Cel to first step of precoat.																					
60	7/12	0.958 (56.21)	Super Cel 0.1	0.220	Al+++ 0.005	Alum 0.012	Soda Ash 0.013	52.66	512 0.439	0.903	0.72	0.32							11.7	0.29	7.92
			512 0.1	0.220																	
61	7/15	0.893 (52.69)	Super Cel 0.1	0.081	Al+++ 0.005	Alum 0.0045	Soda Ash 0.0046	72.96	512 0.609	0.780	0.70	0.38							15.8	0.32	22.92
			512 0.1	0.081																	
J.M. Celite 512 & Alum & Soda Ash to body feed.																					
62	7/16	0.950 (55.74)	Super Cel 0.1	0.264	Al+++ 0.005	Alum 0.015	Soda Ash 0.015	87.21	512 0.727	1.368	0.66	0.52							15.9	0.36	6.63
			512 0.1	0.264				4.79	Alum 0.040												
								4.99	Soda Ash 0.042												
E.P. FW-20 to first step of precoat, J.M. Hyflo Super Cel & anionic polymer to second step of precoat.																					
63	7/16	0.920 (53.98)	FW-20 0.1	0.199	A-23 0.00002	A-23 $3.99x10^{-6}$		19.12	512 0.159	0.576	0.68	0.13							10.2	0.08	9.08
			Super Cel 0.1	0.199				1.051	Alum 0.0088												
								1.09	Soda Ash 0.0091												
64	7/17	0.888 (52.10)	FW-20 0.1	0.169	A-23 0.00002	A-23 $3.38x10^{-6}$		76.04	512 0.634	1.015	0.69	0.16							16.5	0.12	11.15
			Super Cel 0.1	0.169				2.51	Alum 0.021												
								2.61	Soda Ash 0.022												
65	7/17	0.859 (50.40)	FW-20 0.1	0.182	A-23 0.00002	A-23 $3.64x10^{-6}$		108.02	512 0.901	1.366	0.73	0.15							16.4	0.21	10.67
			Super Cel 0.1	0.182				5.95	Alum 0.050												
								6.19	Soda Ash 0.052												

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
E.P.	FW-20 & anionic polymer to second step of precoat.																				
66	7/18	0.904 (53.04)	FW-20 0.1	0.186	A-23 0.00002	A-23 $3.72x10^{-6}$		66.89	512 0.558	0.992	0.71	0.20							16.0	0.30	9.92
			FW-20 0.1	0.186				3.68	Alum 0.031												
								3.83	Soda Ash 0.032												
67	Run terminated due to inadequate precoat.																				
68	Run terminated due to inadequate precoat																				
69	7/18	0.856 (50.22)	FW-20 0.1	0.185	A-23 0.00002	A-23 $3.71x10^{-6}$		55.00	512 0.459	0.881	0.87	0.33							7.9	0.32	10.50
			FW-20 0.1	0.185				3.027	Alum 0.025												
								3.150	Soda Ash 0.026												
J.M.	Celite 512 & anionic polymer to second step of precoat.																				
70	7/19	0.925 (54.27)	FW-20 0.1	0.099	A-23 0.00002	A-23 $1.98x10^{-6}$		29.12	512 0.243	0.468	0.76 (0.90)	0.28 (0.26)	A=0.52 C=0.35	A=BDL C=BDL	0.13	<0.003	266.0	2.0	16.7	0.32	18.17 (3.8)
			512 0.1	0.099				1.603	Alum 0.013												
								1.668	Soda Ash 0.014												
71	7/22	0.877 (51.45)	FW-20 0.1	0.077	A-23 0.00002	A-23 $2.30x10^{-6}$		27.61	512 0.230	0.410	0.59	0.16							14.7	0.50	24.75
			512 0.1	0.077				1.520	Alum 0.013												
								1.581	Soda Ash 0.013												
J.M.	Celite 503 to first step of precoat.																				
72	7/23	0.920 (53.98)	503 0.1	0.063	A-23 0.00003	A-23 $1.89x10^{-6}$		20.83	512 0.174	0.320	0.66 (0.57)	0.17 (0.17)	A=0.54 C=0.09	A=BDL C=0.76	0.09	0.007	26.0	4.41	17.0	0.14	28.67 (1.7)
			512 0.1	0.063				1.146	Alum 0.0096												
								1.193	Soda Ash 0.0099												

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Avg. turb. (Turb. @ time of sample), TU Filter	ORF Fibers x 10^6/l Raw	ORF Fibers x 10^6/l Filter	NWQL Amphibole mg/l Raw	NWQL Amphibole mg/l Filter	UMD Fibers x 10^6/l Raw	UMD Fibers x 10^6/l Filter	Terminal HL Ft. H_2O	Terminal HL Turb. TU	Run Length, Hrs. (Time to Sample)
73	7/25	1.00 (58.67)	503		A-23	A-23			512	0.305	0.74	0.18	A=0.11	A=0.04	0.04	<0.004	60.5	0.921	16.4	0.19	25.00
			0.1	0.067	0.00003	2.00×10^{-6}		18.98	0.158		(0.66)	(0.23)	C=1.43	C=0.35							(16.2)
			512					1.045	Alum 0.0087												
			0.1	0.067				0.5434	Soda Ash 0.0045												
E.P.	FW-20 to first step of precoat.																				
74	7/25	1.011 (59.32)	FW-20		A-23	A-23			512	0.674	0.75	0.24							17.0	0.22	14.50
			0.1	0.114	0.00003	3.41×10^{-6}		49.43	0.412												
			512					2.721	Alum 0.023												
			0.1	0.114				1.416	Soda Ash 0.012												
J.M.	Celite 545 to first step of precoat, J.M. Hyflo Super Cel & anionic polymer to second step of precoat.																				
75	7/26	0.977 (57.32)	545		A-23	A-23			512	0.410	0.59	0.12							14.2	0.15	18.47
			0.1	0.092	0.00005	4.62×10^{-6}		24.93	0.208												
			Super Cel					1.367	Alum 0.011												
			0.1	0.092				0.7138	Soda Ash 0.0060												
76	7/29	0.987 (57.38)	545		A-23	A-23			512	0.423	0.73	0.12							17.0	0.11	13.53
			0.1	0.126	0.00005	6.30×10^{-6}		18.88	0.157												
			Super Cel					1.039	Alum 0.0087												
			0.1	0.126				0.5405	Soda Ash 0.0045												
J.M.	Celite 545 & anionic polymer to second step of precoat.																				
77	7/30	0.958 (56.21)	545		A-23	A-23			512	0.338	0.76	0.11	A=6.11	A=BDL	0.06	<0.003	26.6	1.01	16.8	0.08	32.62
			0.1	0.053	0.00005	2.67×10^{-6}		25.57	0.213		(0.69)	(0.12)	C=0.11	C=0.07							(10.4)
			545					1.408	Alum 0.012												
			0.1	0.053				0.732	Soda Ash 0.0061												

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
78	7/31	0.935 (54.86)	545 0.1	0.081	A-23 0.00005	A-23 $4.03x10^{-6}$		35.77	512 0.298	0.485	0.80	0.11							16.8	0.09	22.12
			545 0.1	0.081				1.970	Alum 0.016												
								1.024	Soda Ash 0.0085												
J.M. Celite 512 to body feed.																					
79	8/1	0.877 (51.45)	545 0.1	0.056	A-23 0.00005	A-23 $2.82x10^{-6}$		69.24	512 0.577	0.690 (0.1955%)	1.07 (0.87)	0.16 (0.17)	A=0.22 C=0.15	A=BDL C=0.04	0.08	0.01	30.2	1.70	16.3	0.13	33.72 (28.9)
			545 0.1	0.056																	
80	8/2	0.770 (45.18)	545 0.1	0.250	A-23 0.00005	A-23 $12.5x10^{-6}$		87.84	512 0.733	1.232 (0.529%)	0.96	0.27							16.5	0.42	8.67
			545 0.1	0.250																	
81	Run terminated due to inadequate polymer setting.																				
J.M. Celite 512 to second step of precoat, Catfloc B to raw water.																					
82	8/6	0.818 (47.99)	545 0.1	0	–	–		36.63	512 0.306	0.421 (0.228%)	0.61 (0.58)	0.20 (0.22)	A=0.6 C=0.28	A=BDL C=0.06	0.09	< 0.007	10.2	0.42	15.6	0.25	40.05 (17.4)
			512 0.1	0				1.646	Catfloc B 0.014												
E.P. FW-50 to first step of precoat, Ca[illegible] raw water.																					
83	8/7	0.870 (51.04)	FW-50 0.1	0.126	–	–		59.70	512 0.498	0.753 (0.4344%)	0.68	0.24							16.8	0.27	15.20
			512 0.1	0.126				0.302	Catfloc B 0.0025												
J.M. Celite 545 to first step of precoat, J.M. Hyflo Super Cel to second step of precoat, Catfloc B to raw water.																					
84	8/8	0.826 (48.46)	545 0.1	0.114	–	–		56.26	512 0.469	0.699 (0.527%)	0.75 (0.68)	0.22 (0.23)	A=0.06	A=BDL	0.05	<0.006	15.1	1.52	15.3	0.41	17.65 (7.9)
			Super Cel 0.1	0.114				0.178	Catfloc B 0.0015												

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)	Avg. turb. (Turb. @ time of sample), TU Raw	TU Filter	ORF Fibers x 10^6/l Raw	ORF Fibers x 10^6/l Filter	NWQL Amphibole mg/l Raw	NWQL Amphibole mg/l Filter	UMD Fibers x 10^6/l Raw	UMD Fibers x 10^6/l Filter	Terminal HL ft. H_2O	Terminal HL Turb. TU	Run Length, Hrs. (Time to Sample)
85	Run terminated for equipment repair.																				
86	8/8	0.807 (47.35)	545 0.1	0.106				65.74	512 0.548	0.764 (0.155%)	1.32	0.30							16.8	0.40	19.50
			Super Cel 0.1	0.106				0.444	Catfloc B 0.0037												
J.M. Celite 512 to second step of precoat, E.P. FW-50 to body feed. Catfloc B to raw water.																					
87	8/9	0.974 (57.15)	545 0.1	0.140				86.51	FW-50 0.724	1.008 (0.220%)[b]	1.06	0.23							6.6	0.25	12.20
			512 0.1	0.140				0.387	Catfloc B 0.0032												
88	8/13	0.914 (53.62)	545 0.1	0.036				105.17	FW-50 0.877	0.953 (0.109%)[b]	0.65 (0.60)	0.17 (0.12)	A=0.13 C=0.2	A=BDL C=0.1	0.06	<0.005	20.0	0.59	10.8	0.10	50.28 (22.0)
			512 0.1	0.036				0.378	Catfloc B 0.0032												
E.P. FW-50 to first step of precoat, J.M. Celite 512 & Alum & Soda Ash to second step of precoat, J.M. Hyflo Super Cel to body feed. No Catfloc B																					
89	8/15	1.007 (59.08)	FW-50 0.1	0.041	Al+++ 0.01	Alum 0.0046	Soda Ash 0.0028	54.04	Super Cel 0.451	0.540 (0.748%)[b]	0.63 (0.71)	0.15 (0.16)	A=0.09 C=0.17	A=0.15 C=0.44	0.06	<0.003	8.98	1.27	9.3	0.21	39.92 (18.3)
			512 0.1	0.041																	
90	8/16	0.977 (57.32)	FW-50 0.1	0.173	Al+++ 0.01	Alum 0.019	Soda Ash 0.0095	77.25	Super Cel 0.644	1.018 (0.247)[b]	0.70	0.21							4.2	0.23	9.88
			512 0.1	0.173																	
91	8/16	0.953 (55.91)	FW-50 0.1	0.138	Al+++ 0.01	Alum 0.015	Soda Ash 0.0076	152.63	Super Cel 1.273	1.573 (0.356%)	0.83	0.14							7.6	0.34	12.63
			512 0.1	0.138																	
92	8/19	0.928 (54.45)	FW-50 0.1	0.083	Al+++ 0.01	Alum 0.0091	Soda Ash 0.0045	125.16	Super Cel 1.042	1.223 (0.470%)[b]	0.58	0.14							8.5	0.14	21.75
			512 0.1	0.083																	

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal	Other chem. in precoat, lbs / 1000 gal	Body feed, mg/l	Body feed, lb. / 1000 gal	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
93	8/19	0.847 (49.69)	FW-50 0.1	0.088	Al+++ 0.01	Alum 0.0097	Soda Ash 0.0049	275.6	Super Cel 2.294	2.485 (0.641%)	0.76	0.19							9.3	0.28	22.33
			512 0.1	0.088																	
J.M. Celite 512 to body feed.																					
94	8/20	0.830 (48.70)	FW-50 0.1	0.084	Al+++ 0.01	Alum 0.0093	Soda Ash 0.0046	78.21	512 0.652	0.835 (0.266%)[b]	0.72	0.15							9.6	0.15	23.83
			512 0.1	0.084																	
95	8/21	0.868 (50.93)	FW-50 0.1	0.184	Al+++ 0.01	Alum 0.020	Soda Ash 0.010	98.01	512 0.817	1.216 (0.6894%)	0.67	0.30							15.6	0.53	10.42
			512 0.1	0.184																	
96	8/22	0.952 (55.85)	FW-50 0.1	0.292	Al+++ 0.01	Alum 0.032	Soda Ash 0.016	175.53	512 1.464	2.086 (0.892%)	0.68	0.40							10.2	0.57	6.00
			512 0.1	0.292																	
97	8/22	0.916 (53.74)	FW-50 0.1	0.113	Al+++ 0.01	Alum 0.012	Soda Ash 0.0062	102.35	512 0.854	1.099 (0.254%)[b]	0.60	0.24							10.5	0.25	16.08
			512 0.1	0.113																	
98	8/23	0.953 (55.91)	FW-50 0.1	0.356	Al+++ 0.02	Alum 0.078	Soda Ash 0.039	98.41	512 0.821	1.649 (0.931%)	0.55	0.21							15.6	0.18	4.92
			512 0.1	0.356																	
E.P. FW-2 & Alum & Soda Ash to second step of precoat.																					
99	8/23	0.994 (58.32)	FW-50 0.1	1.118	Al+++ 0.01	Alum 0.082	Soda Ash 0.041	94.09	512 0.745	2.423 (1.924%)[b]	0.54	0.36							10.0	0.25	2.25
			FW-2 0.1	0.745																	

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
J.M. Hyflo Super Cel & Alum & Soda Ash to second step of precoat.																					
100	8/23	0.876 (51.40)	FW-50 0.1	0.387	Al+++ 0.01	Alum 0.043	Soda Ash 0.021	59.37	512 0.495	1.333 (1.155%)	0.52	0.45							5.8	0.67	4.92
			Super Cel 0.1	0.387																	
J.M. Celite 512 & Alum & Soda Ash to second step of precoat. E.P. FW-20 to body feed.																					
101	8/26	0.934 (54.80)	FW-50 0.15	0.111	Al+++ 0.01	Alum 0.0081	Soda Ash 0.0041	63.76	FW-20 0.532	0.729 (0.021%)[b]	0.49	0.13							6.1	0.16	24.12
			512 0.1	0.074																	
102	8/27	0.952 (55.85)	FW-50 0.15	0.126	Al+++ 0.01	Alum 0.0092	Soda Ash 0.0046	140.85	FW-20 1.175	1.399 (0.226%)[b]	0.47	0.09							8.5	0.09	20.83
			512 0.1	0.084																	
103	8/28	0.972 (57.03)	FW-50 0.15	0.113	Al+++ 0.01	Alum 0.0083	Soda Ash 0.0041	257.01	FW-20 2.143	2.344 (0.338%)[b]	0.47 (0.43)	0.12 (0.11)	A=0.39 C=0.48	A=0.15 C=0.24	0.09	<0.003	10.4	1.05	8.2	0.10	22.75 (6.4)
			512 0.1	0.075																	
J.M. Hyflo Super Cel & Alum & Soda Ash to body feed.																					
104	8/29	0.888 (52.10)	FW-50 0.15	0.127	Al+++ 0.01	Alum 0.0093	Soda Ash 0.0046	11.81	Super Cel 0.098	0.340 (0.164%)	0.50	0.09							17.0	0.06	21.60
			512 0.1	0.084				1.298	Alum 0.011												
								0.650	Soda Ash 0.0054												
105	8/30	0.937 (54.97)	FW-50 0.15	0.229	Al+++ 0.01	Alum 0.017	Soda Ash 0.0084	48.75	Super Cel 0.407	0.880 (0.189%)	0.46 (0.39)	0.12 (0.12)	A=0.78 C=0.33	A=0.04 C=0.17	0.07	<0.003	17.8	0.65	16.4	0.11	11.67 (8.3)
			512 0.1	0.152				5.358	Alum 0.045												
								2.685	Soda Ash 0.022												

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
106	8/30	0.918 (53.86)	FW-50 0.15	0.300	Al+++ 0.01	Alum 0.022	Soda Ash 0.011	83.84	Super Cel 0.699	1.347 (0.448%)	0.78	0.20							17.0	0.19	9.08
			512 0.1	0.200				9.215	Alum 0.077												
								4.617	Soda Ash 0.039												
J.M. Celite 512 & Alum & Soda Ash to body feed.																					
107	9/3	0.822 (48.23)	FW-50 0.15	0.148	Alum 0.01	Alum 0.00099	Soda Ash 0.0054	29.19	512 0.243	0.537 (0.164%)	0.62	0.165							17.0	0.19	19.81
			512 0.1	0.099				3.208	Alum 0.027												
								1.607	Soda Ash 0.013												
108	9/4	0.915 (53.68)	FW-50 0.15	0.223	Alum 0.01	Alum 0.0015	Soda Ash 0.0082	42.78	512 0.357	0.797 (0.334%)	0.67 (0.71)	0.22 (0.22)	A=1.61 C=0.33	A=0.17 C=1.15	0.10	<0.006	30.3	0.96	17.0	0.27	12.25 (8.2)
			512 0.1	0.149				4.702	Alum 0.039												
								2.356	Soda Ash 0.020												
109	9/4	0.916 (53.74)	FW-50 0.15	0.318	Alum 0.01	Alum 0.0021	Soda Ash 0.012	106.72	512 0.890	1.580 (0.249%)	0.65	0.31							17.0	0.45	8.21
			512 0.1	0.212				11.73	Alum 0.098												
								5.877	Soda Ash 0.049												
J.M. Hyflo Super Cel to body feed, Catfloc B to raw water.																					
110	9/5	0.929 (54.50)	FW-50 0.15	0.131	Al+++ 0.01	Alum 0.0096	Soda Ash 0.0048	57.17	Super Cel 0.477	0.712 (0.1395%)[b]	0.68	0.14							11.2	0.08	20.50
			512 0.1	0.088				0.199	Catfloc B 0.0017												

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
Anionic polymer added in place of Alum and Soda Ash in second step of precoat, J.M. Celite 512 & Alum & Soda Ash to body feed.																					
111	9/6	0.946 (55.50)	FW-50 0.15	0.166	A-23 0.00003	A-23 3.32×10^{-6}		27.44	512 0.229	0.543 (0.195%)	0.47 (0.51)	0.09 (0.13)	A=0.72 C=0.39	A=0.02 C=0.59	0.07	<0.003	13.6	0.36	17.0	0.09	15.82 (2.9)
			512 0.1	0.111				3.016	Alum 0.025												
								1.511	Soda Ash 0.013												
J.M. Hyflo Super Cel & anionic polymer to second step of precoat.																					
112	9/7	1.008 (59.14)	FW-50 0.15	0.377	A-23 0.00003	A-23 7.53×10^{-6}		20.07	512 0.167	0.823 (0.325%)[b]	0.39	0.06							8.8	0.05	6.85
			Super Cel 0.1	0.251				2.206	Alum 0.018												
								1.105	Soda Ash 0.0092												
J.M. Celite 512 & Alum & Soda Ash to second step of precoat, J.M. Hyflo Super Cel to body feed, Catfloc B to raw water.																					
113	9/9	1.002 (58.79)	FW-50 0.15	0.109	Al+++ 0.01	Alum 0.0080	Soda Ash 0.0040	14.17	Super Cel 0.952	1.145 (0.217%)[b]	0.50 (0.46)	0.08 (0.08)	A=1.0 C=0.5	A=0.04 C=1.0	0.04	<0.003	15.4	0.33	10.1	0.10	23.00 (4.1)
			512 0.1	0.072				0.286	Catfloc B 0.0024												
114	9/10	0.969 (56.85)	FW-50 0.15	0.111	Al+++ 0.01	Alum 0.0081	Soda Ash 0.0041	221.79	Super Cel 1.850	2.050 (0.276%)[b]	0.63	0.08							11.9	0.10	23.33
			512 0.1	0.072				0.407	Catfloc B 0.0034												
J.M. Celite 512 to body feed, Catfloc B to raw water.																					
115	9/11	0.862 (50.57)	FW-50 0.15	0.131	Al+++ 0.01	Alum 0.0096	Soda Ash 0.0048	55.15	512 0.460	0.698 (0.131%)	0.53 (0.45)	0.09 (0.15)	A=0.3 C=0.3	A=BDL C=0.13	0.06	<0.005	13.0	0.28	16.9	0.05	22.07 (6.0)
			512 0.1	0.088				0.557	Catfloc B 0.0046												
116	9/12	0.783 (45.94)	FW-50 0.15	0.124	Al+++ 0.01	Alum 0.0091	Soda Ash 0.0046	123.40	512 1.029	1.254 (0.217%)	0.42	0.06							14.8	0.05	25.67
			512 0.1	0.083				0.477	Catfloc B 0.0040												

APPENDIX C-3 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibers x 10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibers x 10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
J.M. Aqua Cel to body feed, Catfloc B to raw water.																						
117	9/13	0.930 (54.56)	FW-50 0.15	0.130	Al+++ 0.01	Alum 0.0095	Soda Ash 0.0048	70.46	Aqua Cel 0.588	0.821 (0.074%)[b]	0.45 (0.40)	0.06 (0.08)	A=0.02 C=0.06	A=0.02 C=0.4	0.09	<0.003	30.0	0.47	7.4	0.04	20.75 (2.7)
			512 0.1	0.086				0.414	Catfloc B 0.0035													
118	9/16	0.826 (48.46)	FW-50 0.15	0.141	Al+++ 0.01	Alum 0.010	Soda Ash 0.0052	154.74	Aqua Cel 1.291	1.545 (0.210%)[b]	0.42 (0.37)	0.08 (0.08)	A=0.9 C=0.15	A=BDL C=1.3	0.08	<0.004	20.3	4.89	6.9	0.07	21.53 (4.5)
			512 0.1	0.094				0.584	Catfloc B 0.0049													
J.M. Aqua Cel to body feed for first half of run, E.P. FW-20 to body feed for remainder of run, Catfloc B to raw water.																						
119	9/17	0.8445 (49.55)	FW-50 0.15	0.120	Al+++ 0.01	Alum 0.0088	Soda Ash 0.0044	283.05	Aqua Cel FW-20 2.361	2.579 (0.239%)[b]	0.49	0.07							7.4	0.10	24.67
			512 0.1	0.080				0.566	Catfloc B 0.0047													
J.M. Celite 503 & Alum & Soda Ash to body feed.																						
120	9/19	0.861 (50.52)	FW-50 0.15	0.207	Al+++ 0.01	Alum 0.015	Soda Ash 0.0076	22.66	503 0.189	0.589 (0.207%)[b]	0.50 (0.52)	0.08 (0.11)	A=0.6 C=0.09	A=0.02 C=1.8	0.10	<0.004	13.8	0.76	14.2	0.07	14.00 (2.0)
			512 0.1	0.138				2.4905	Alum 0.021													
								1.248	Soda Ash 0.010													
121	9/20	0.864 (50.69)	FW-50 0.15	0.235	Al+++ 0.01	Alum 0.017	Soda Ash 0.0086	49.99	503 0.417	0.902 (0.054%)	0.45	0.06							16.8	0.06	12.33
			512 0.1	0.156				5.495	Alum 0.046													
								2.753	Soda Ash 0.023													
122	9/20	0.795 (46.61)	FW-50 0.15	0.297	Al+++ 0.01	Alum 0.022	Soda Ash 0.011	75.26	503 0.628	1.259 (0.222%)	0.46	0.09							16.3	0.12	10.58
			512 0.1	0.198				8.272	Alum 0.069													
								4.144	Soda Ash 0.035													

[a] B.W. volume was not measured until Run 79.

[b] Runs did not reach terminal H_L or turbidity.

[c] A=amphibole, C=chrysotile

APPENDIX C-4 PRESSURE DIATOMACEOUS EARTH FILTRATION (ERD-1) SUMMARY OF INDIVIDUAL RUNS

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs./1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs/1000 gal.	Other chem. in precoat, lbs/1000 gal.	Body feed, mg/l	Body feed, lb./1000 gal.	B.W. solids, lbs/1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibers x 10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibers x 10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
One-step precoat, E.P. FW-50 & J.M. Celite 503 & cationic polymer to precoat, Dicalite Speedflow to body feed. B.W. solids calc. from chem. & H.L. additions.																					
1A	6/11	1.189 (69.76)	FW-50 0.1	0.027	573-C 0.0005	573-C 2.7×10^{-5}		30.88	Speedflow 0.258	0.312	2.7 (1.91)	0.25 (0.36)	A-1.0 C-1.6	A-1.0 C-0.3	0.12	<0.01	33.25	6.93	104.0	0.14	49.80 (2.8) (49.8)
	6/13		503 0.1	0.027								(2.11) (0.15)	A-0.48 C-0.41	A-0.09 C-0.71							
J.M. Celite 503 & J.M. Celite 545 & cationic polymer to precoat, J.M. Celite 503 to body feed.																					
2A	6/13	1.358 (79.67)	503 0.1	0.091	573-C 0.0005	573-C 9.14×10^{-5}		110.20	503 0.919	1.102	1.9	0.55							9.2	0.55	13.42
			545 0.1	0.091																	
J.M. Celite 503 & Dicalite Speedflow & cationic polymer to precoat, Dicalite Speedflow to body feed.																					
3A	6/14	1.215 (71.28)	503 0.1	0.069	573-C 0.0007	573-C 7.29×10^{-5}		122.98	Speedflow 1.025	1.130	1.9	0.17							63.5	0.10	19.75
			Speed flow 0.05	0.035																	
4A	6/17	1.227 (71.99)	503 0.05	0.028	573-C 0.0008	573-C 6.81×10^{-5}		41.34	Speedflow 0.345	0.430	0.91 (0.96)	0.14 (0.15)	A-0.61 C-2.15	A-BDL C-1.37	0.17	0.005	10.64	7.07	55.4	0.11	23.90 (4.9)
			Speed flow 0.1	0.057																	
5A	6/18	1.213 (71.17)	503 0.05	0.034	573-C 0.0008	573-C 8.04×10^{-5}		195.98	Speedflow 1.635	1.735	0.91	0.10							98.1	0.07	20.5
			Speed flow 0.1	0.067																	
6A	6/19	1.199 (70.35)	503 0.05	0.042	573-C 0.0008	573-C 10.16×10^{-5}		37.68	Speedflow 0.314	0.441	0.90	0.16							47.3	0.15	16.42
			Speed flow 0.1	0.085																	

[a] B.W. volume was not measured.

[b] A-amphibole, C-chrysotile

APPENDIX C-4 PRESSURE DIATOMACEOUS EARTH FILTRATION (ERD-2) SUMMARY OF INDIVIDUAL RUNS

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs./1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs./1000 gal.	Other chem. in precoat, lbs./1000 gal.	Body feed, mg/l	Body feed, lb./1000 gal.	B.W. solids, lbs./1000 gal. (B.W. vol. as % of treated water)[3]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hr (Time to Sample)
One step precoat. B.W. Solids calc. from chem. & D.E. additions.																					
1	Effluent turbidity too high.																				
J.M. Hyflo Super Cel to precoat and to body feed.																					
2	5/2	1.572 (92.23)	Super Cel 0.15	M 0.070	–	–		29.97	Super Cel 0.233	0.304	0.66	0.56							19.6	0.62	22.58
J.M. Hyflo Super Cel & E.P. FW-50 & anionic pulymer to precoat.																					
3	5/3	1.641 (96.28)	Super Cel 0.05	M-C 0.034	A-23 0.00005	$5.1x10^{-6}$		26.75	Super Cel 0.223	0.326	0.67	0.82							36.9	0.98	14.75
			FW-50 0.1	0.069																	
4	Effluent turbidity too high.																				
5	Effluent turbidity too high.																				
6	Effluent turbidity too high.																				
J.M. Celite 512 & Dicalite Speedflow to precoat.																					
7	5/9	1.600 (93.87)	512 0.1	F-F 0.053	–	–		68.75	Super Cel 0.573	0.653	0.72	0.16							50.8	0.18	19.66
			Speed flow 0.05	0.027																	
Dicalite Speedflow & E.P. FW-50 to precoat.																					
8	5/10	1.589 (93.23)	Speed flow 0.1	F-C 0.053	–	–		69.16	Super Cel 0.577	0.657	0.70	0.17							68.1	0.26	19.75
			FW-50 0.05	0.027																	
9	5/13	1.566 (91.88)	Speed flow 0.1	F-C 0.025	–			70.19	Super Cel 0.586	0.623	1.0	0.29							92.4	0.50	42.58
			FW-50 0.05	0.012																	

APPENDIX C-4 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs./1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs./1000 gal.	Other chem. in precoat, lbs./1000 gal.	Body feed, mg/l	Body feed, lb./1000 gal.	B.W. solids, lbs/1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Avg. turb. (Turb. @ time of sample), TU Filter	ORF Fibersx10^6/l Raw	ORF Fibersx10^6/l Filter	NWQL Amphibole mg/l Raw	NWQL Amphibole mg/l Filter	UMD Fibersx10^6/l Raw	UMD Fibersx10^6/l Filter	Terminal HL Ft. H_2O	Terminal HL Turb. TU	Run Length, Hrs. (Time to Sample)
10	5/16	1.553 (91.32)	Speed flow 0.1	F - C 0.028				70.8	Super Cel 0.590	0.633	1.2 (0.8)	0.29 (0.13)	A=2.61 C=1.35	A=0.261 C=1.04	0.14	0.003			104.0	0.35	37.43 (30.6)
			FW-50 0.05	0.014																	
11	5/16	1.728 (101.38)	Speed flow 0.1	F - C 0.060				63.59	Super Cel 0.530	0.621	1.1	0.35							103.9	0.25	16.00
			FW-50 0.05	0.030																	
Cationic polymer also added to precoat.																					
12	5/17	1.204 (70.64)	Speed flow 0.1	F - C 0.094	C-31 0.0005	7.06×10^{-5}		91.30	Super Cel 0.761	0.903	0.87	0.32							25.4	0.25	14.7
			FW-50 0.05	0.047																	
13	5/22	1.153 (67.65)	Speed flow 0.1	F - C 0.013	C-31 0.0005	0.96×10^{-5}		79.40	Super Cel 0.662	0.682	0.98 (0.94)	0.18 (0.17)			0.20	0.002			104.0	0.25	112.89 (47.3)
			FW-50 0.05	0.0064																	
14	5/30	1.135 (66.59)	Speed flow 0.1	F - C 0.020	573C 0.0005	1.51×10^{-5}		55.17	Super Cel 0.460	0.490	0.85 (0.80)	0.175 (0.14)	A=1.43 C=1.83	A=BDL C=0.043	0.19	0.004			104.0	0.20	71.84 (46.0)
			FW-50 0.05	0.010																	
J.M. Celite 503 & Dicalite Speedflow & cationic polymer to precoat, Dicalite Speedflow to body feed.																					
15	6/4	1.069 (62.72)	503 0.1	MC-F 0.019	573C 0.0006	1.7×10^{-5}		86.01	Speed plus 0.717	0.746	0.75 (0.86)	0.15 (0.15)	A=1.74 C=2.91	A=.039 C=1.00	0.26	0.003			104.0	0.12	78.97 (27.7)
15	6/6		Speed flow 0.05	0.0095							(3.74)	(0.15)	A=1.5 C=2.3	A=0.1 C=0.4	0.18	<0.004					(75.4)

APPENDIX C-4 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m3/m2 day)	Precoat, lbs./ft2	Precoat, lbs./1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs./1000 gal.	Other chem. in precoat, lbs./1000 gal.	Body feed, mg/l	Body feed, lb./1000 gal.	B.W. solids, lbs./1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibers x 10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibers x 10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs (Time to Sample)
16	Effluent turbidity too high.																				
17	Effluent turbidity too high.																				
18	Effluent turbidity too high.																				
19	Run terminated due to failure in body feed system.																				
Dicalite Speedflow & J.M. Celite 503 S cationic polymer to precoat.																					
20	6/20	1.039 (60.96)	Speed flow 0.1	F-MC 0.108	573C 0.0008	0.00013		19.57	Speedflow 0.363	0.326	1.12	0.17							39.3	0.22	14.83
			503 0.05	0.054																	
Alum used in place of cationic polymer.																					
21	6/21	1.058 (62.07)	Speed flow 0.1	F-MC 0.073	Alum 0.01	0.0011		19.97	Speedflow 0.167	0.277	1.16	0.11							55.4	0.14	21.55
			503 0.05	0.037																	
22	6/24	1.046 (61.37)	Speed flow 0.1	F-MC 0.126	Alum 0.01	0.0019		16.92	Speedflow 0.141	0.332	0.69 (0.66)	0.10 (0.06)	A=1.0 C=3.91	A=0.02 C=0.24			6.03	1.85	32.4	0.11	12.65 (4.5)
			503 0.05	0.063																	
23	6/24	1.021 (59.90)	Speed flow 0.1	F-MC 0.156	Alum 0.01	0.0023		38.82	Speedflow 0.324	0.560	0.65	0.13							35.8	0.08	10.48
			503 0.05	0.078																	
24	6/25	1.179 (69.17)	Speed flow 0.1	F-MC 0.127	Alum 0.019	0.0036		105.44	Speedflow 0.879	1.074	0.66	0.10							67.0	0.18	11.08
			503 0.05	0.064																	

APPENDIX C-4 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	TU Filter	ORI Fibers x 10^6/l Raw	ORI Fibers x 10^6/l Filter	NWQL Amphibole mg/l Raw	NWQL Amphibole mg/l Filter	UMD Fibers x 10^6/l Raw	UMD Fibers x 10^6/l Filter	Terminal Hl. Ft. H_2O	Terminal Hl. Turb. TU	Run Length, Hr (Time to Sample)
25	6/25	1.099 (64.48)	Speed flow 0.1	F-MC 0.104	Alum 0.01	0.0016		114.14	Speedflow 0.952	1.109	0.66	0.09							64.7	0.05	14.58
			503 0.05	0.052																	
26	6/26	1.088 (63.83)	Speed flow 0.1	F-MC 0.101	Alum 0.01	0.0015		226.35	Speedflow 1.888	2.041	0.68	0.09							72.2	0.09	15.16
			503 0.05	0.050																	
E.P. FW-10 & J.M. Celite 503 & Alum to precoat, E.P. FW-10 to body feed.																					
27	6/27	1.122 (65.83)	FW-10 0.1	M-MC 0.145	Alum 0.02	0.0043		40.23	FW-10 0.336	0.557	0.64	0.10							25.4	0.11	10.25
			503 0.05	0.072																	
Two step precoat, E.P. FW-50 to first step of precoat, E.P. FW-6 & Alum to second step of precoat.																					
28	6/28	1.194 (70.05)	FW-50 0.1	C-F 0.057	Alum 0.01	0.00057		36.27	FW-10 0.302	0.417	0.66 (0.64)	0.10 (0.07)	A=1.11 C=8.12	A=0.11 C=5.3	0.16	< 0.01	5.54	0.73	26.6	0.07	24.41 (27.3)
			FW-6 0.1	0.057																	
29	6/28	1.167 (68.47)	FW-50 0.1	C-F 0.103	Alum 0.01	0.0010		54.51	FW-10 0.455	0.662	0.67	0.12							16.2	0.15	13.83
			FW-6 0.1	0.103																	
30	7/1	1.160 (68.06)	FW-50 0.1	C-F 0.036	Alum 0.01	0.00036		26.19	FW-10 0.218	0.292	0.78	0.14							27.7	0.14	39.42
			FW-6 0.1	0.036																	
31	7/3	1.165 (68.35)	FW-50 0.1	C-F 0.262	Alum 0.01	0.0026		76.01	FW-10 0.634	1.160	0.74	0.15							10.4	0.16	5.47
			FW-6 0.1	0.262																	

APPENDIX C-4 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 ($m^3/m2$ day)	Precoat, lbs./ft2	Precoat, lbs./1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs./1000 gal.	Other chem. in precoat, lbs./1000 gal.	Body feed, mg/l	Body feed, lb./1000 gal.	B.W. solids, lbs./1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	TU Filter	ORF Fibers x 10^6/l Raw	ORF Fibers x 10^6/l Filter	NWQL Amphibole mg/l Raw	NWQL Amphibole mg/l Filter	UMD Fibers x 10^6/l Raw	UMD Fibers x 10^6/l Filter	Terminal HL Ft. H_2O	Terminal HL Turb. TU	Run Length, Hrs. (Time to Sample)
J.M. Celite 512 & Alum to second step of precoat.																					
32	7/3	1.204 (70.64)	FW-50 0.1	C-F 0.062	Alum 0.01	0.00062		71.42	FW-10 0.59	0.721	0.73 (0.69)	0.14 (0.17)	A=0.56 C=3.57	A=0.1 C=0.8	0.07	0.003	2.99	1.22	23.1	0.15	22.2 (2.0)
			512 0.1	0.062																	
33	7/4	1.107 (64.95)	FW-50 0.1	C-F 0.067	Alum 0.01	0.00067		151.53	FW-10 1.264	1.398	0.62	0.11							23.1	0.09	22.50
			512 0.1	0.067																	
J.M. Celite 545 to first step of precoat, J.M. Hyflo Super Cel & Alum to second step of precoat.																					
34	7/8	1.135 (66.59)	545 0.1	VC-M 0.047	Al+++ 0.01	0.0052		29.07	FW-10 0.242	0.342	0.66	0.09							63.5	0.08	31.08
			Super Cel 0.1	0.047																	
35	7/9	1.196 (70.17)	545 0.1	VC-M 0.031	Al+++ 0.01	0.0034		116.58	FW-10 0.972	1.083	1.08	0.15							55.4	0.11	45.47
			Super Cel 0.1	0.031																	
36	7/11	1.120 (65.71)	545 0.1	VC-M 0.038	Al+++ 0.01	0.0041		86.25	FW-10 0.719	0.799	1.3	0.11							50.8	0.12	39.58
			Super Cel 0.1	0.038																	
37	7/15	1.098 (64.42)	545 0.1	VC-M 0.067	Al+++ 0.01	0.0074		156.41	FW-10 1.304	1.447	0.70	0.11							37.0	0.13	22.5
			Super Cel 0.1	0.067																	
E.P. FW-50 to first step of precoat, E.P. FW-20 & Alum & Soda Ash to second step of precoat, E.P. FW-20 to body feed.																					
38	7/16	1.23 (72.16)	FW-50 0.1	C-MC 0.044	Al+++ 0.01	0.0048	Soda Ash 0.0051	34.56	FW-20 0.297	0.390	0.71	0.09							23.1	0.11	30.75
			FW-20 0.1	0.044																	

APPENDIX C-4 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
39	7/17	1.075 (63.07)	FW-50 0.1	C-MC 0.056	Al+++ 0.01	0.0062	Soda Ash 0.0065	63.89	FW-20 0.533	0.658	0.71	0.10							16.2	0.11	27.5
			FW-20 0.1	0.056																	
40	7/19	1.155 (67.76)	FW-50 0.1	C-MC 0.050	Al+++ 0.01	0.0055	Soda Ash 0.0057	116.62	FW-20 0.974	1.083	0.78 (0.90)	0.11 (0.12)	A=0.52 C=0.35	A=0.11 C=0.22	0.13	<0.003	266.0	4.16	18.5	0.14	29.08 (9.9)
			FW-20 0.1	0.050																	
41	7/23	1.195 (70.11)	FW-50 0.1	C-MC 0.049	Al+++ 0.01	0.0052	Soda Ash 0.0056	200.51	FW-20 1.672	1.781	0.59 (0.57)	0.12 (0.09)	A=0.54 C=0.09	A=0.09 C=0.09	0.09	<0.003	26.0	2.04	23.1	0.09	28.52 (27.5)
			FW-20 0.1	0.049																	
J.M. Celite 512 & Alum & Soda Ash to second step of precoat, J.M. Celite 545 to body feed.																					
42	7/23	1.11 (65.24)	FW-50 0.1	C-F 0.054	Al+++ 0.01	0.0060	Soda Ash 0.0062	26.12	545 0.218	0.339	0.71	0.12							21.9	0.18	27.52
			512 0.1	0.054																	
43	7/25	1.024 (60.08)	FW-50 0.1	C-F 0.073	Al+++ 0.01	0.0080	Soda Ash 0.0043	42.04	545 0.351	0.509	0.73 (0.66)	0.13 (0.09)	A=0.11 C=1.43	A=BDL C=0.44	0.04	<0.003	60.5	0.964	47.4	0.14	22.33 (13.8)
			512 0.1	0.073																	
44	7/25	1.018 (59.73)	FW-50 0.1	C-F 0.049	Al+++ 0.01	0.0054	Soda Ash 0.0029	60.16	545 0.502	0.603	0.66	0.15							18.5	0.21	33.42
			512 0.1	0.049																	
J.M. Celite 545 to first step of precoat, J.M. Celite 512 to second step of precoat, J.M. Celite 545 to body feed, Catfloc B to raw water.																					
45	7/30	1.01 (59.26)	545 0.1	VC-F 0.036	-	-		58.29	545 0.486	0.563	0.73 (0.69)	0.11 (0.10)	A=0.11 C=0.11	A=BDL C=0.07	0.06	<0.003	26.6	0.87	18.5	0.08	45.42 (21.5)
			512 0.1	0.036				0.483	Catfloc B 0.0040												

APPENDIX C-4 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m3/m2 day)	Precoat, lbs./ft2	Precoat, lbs. / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs (Time to Sample)
46	8/1	1.087 (63.77)	545	VC-F	–	–			545	0.994	0.83	0.12	A=0.22	A=BDL	0.08	<0.002	30.0	0.79	15.0	0.14	28.25
			0.1	0.054				105.74	0.882		(0.87)	(0.12)	C=0.15	C=0.13							(24.3)
			512						Catfloc B												
			0.1	0.054				0.449	0.0037												
47	8/1	1.005 (58.96)	545	VC-F	–	–			545	0.609	1.10	0.13							13.9	0.18	33.75
			0.1	0.049				60.94	0.[illegible]8												
			512						Catfloc B												
			0.1	0.049				0.559	0.0047												
48	8/6	1.261 (73.98)	545	VC-F	–	–			545	0.455	0.61	0.09	A=0.6	A=0.02	0.09	<0.002	10.2	2.0	15.0	0.08	26.50
			0.1	0.050				42.08	0.351		(0.58)	(0.07)	C=0.3	C=0.04							(22.3)
			512						Catfloc B												
			0.1	0.050				0.532	0.0044												
J.M. Hyflo Super Cel to second step of precoat, E.P. FW-50 to body feed, Catfloc B to raw water.																					
49	8/8	1.266 (74.28)	545	VC-M	–				FW-50	0.554	0.64	0.11	A=0.06	A=BDL	0.05	<0.002	15.1	0.34	18.5	0.08	44.42
			0.1	0.030				58.84	0.491		(0.68)	(0.10)	C=0.09	C=0.04							(42.8)
			Super Cel						Catfloc B												
			0.1	0.030				0.533	0.0044												
E.P. FW-20 to second step of precoat.																					
50	8/8	1.173 (68.82)	545	VC-MC	–	–			FW-50	0.935	1.18	0.20							33.5	0.21	37.67
			0.1	0.038				102.68	0.856												
			FW-20						Catfloc B												
			0.1	0.038				0.398	0.0033												
E.P. FW-50 to first step of precoat, J.M. Hyflo Super Cel to second step of precoat. Catfloc B to raw water.																					
51	8/13	1.059 (62.13)	FW-50	C-M	–	–			FW-50	0.815	0.64	0.09	A=0.13	A=0.04	0.06	<0.003	20.0	0.51	16.2	0.09	23.67
			0.1	0.066				81.06	0.676		(0.60)	(0.09)	C=0.20	C=0.5							(21.5)
			Super Cel						Catfloc B												
			0.1	0.066				0.677	0.0057												
52	Run terminated, did not precoat.																				
53	Run terminated, did not precoat.																				

APPENDIX C-4 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs / 1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs / 1000 gal.	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[1]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibers x 10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibers x 10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
J.M. Celite 512 & Alum & Soda Ash to second step of precoat. J.M. Hyflo Super Cel to body feed, no Catfloc B.																					
54	8/13	1.040 (61.02)	FW-50 0.1	C-F 0.081	Alum 0.01	0.00081	Soda Ash 0.0040	23.38	Super Cel 0.195	0.357	0.66	0.15							11.6	0.22	19.92
			512 0.1	0.081																	
55	8/15	1.031 (60.49)	FW-50 0.1	C-F 0.072	Al+++ 0.01	Alum 0.0079	Soda Ash 0.0039	35.12	Super Cel 0.293	0.448	0.71 (0.71)	0.10 (0.18)	A=0.09 C=0.17	A=0.04 C=0.04	0.06	<0.003	8.98	1.53	23.1	0.18	22.57 (21.9)
			512 0.1	0.072																	
56	8/15	1.024 (60.08)	FW-50 0.1	C-F 0.072	Al+++ 0.01	Alum 0.0079	Soda Ash 0.0039	47.69	Super Cel 0.398	0.549	0.60	0.10							16.2	0.14	22.75
			512 0.1	0.072																	
57	8/16	1.069 (62.72)	FW-50 0.1	C-F 0.078	Al+++ 0.01	Alum 0.0086	Soda Ash 0.0043	73.40	Super Cel 0.612	0.781	0.80	0.12							20.8	0.16	20.00
			512 0.1	0.078																	
58	8/19	1.048 (61.49)	FW-50 0.1	C-F 0.072	Al+++ 0.01	Alum 0.0080	Soda Ash 0.0040	132.25	Super Cel 1.103	1.260	0.58	0.08							20.8	0.18	21.95
			512 0.1	0.072																	
J.M. Celite 512 to body feed.																					
59	8/20	1.058 (62.07)	FW-50 0.1	C-F 0.069	Al+++ 0.01	Alum 0.0076	Soda Ash 0.0038	27.69	512 0.231	0.380	0.77 (0.84)	0.09 (0.10)	A=0.36 C=0.72	A=BDL C=0.17	0.02	<0.003	25.3	0.81	27.7	0.27	22.83 (14.5)
			512 0.1	0.069																	
60	8/21	1.088 (63.83)	FW-50 0.1	C-F 0.066	Al+++ 0.01	Alum 0.0073	Soda Ash 0.0036	43.94	512 0.366	0.510	0.72	0.11							22.0	0.13	23.12
			512 0.1	0.066																	
61	Filter pump trip out during precoat, cooled 1½ hrs.																				

APPENDIX C-4 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs./1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs./1000 gal.	Other chem. in precoat, lbs./1000 gal.	Body feed, mg/l	Body feed, lb./1000 gal.	B.W. solids, lbs/1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibersx10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibersx10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
62	8/22	1.073 (62.95)	FW-50 0.1	C-F 0.071	Al+++ 0.01	Alum 0.0079	Soda Ash 0.0039	92.57	512 0.772	0.927	0.68	0.09							26.6	0.47	21.77
			512 0.1	0.071																	
E.P.	FW-20 to body feed.																				
63	8/23	1.061 (62.25)	FW-50 0.1	C-F 0.074	Al+++ 0.01	Alum 0.0082	Soda Ash 0.0049	39.83	FW-20 0.332	0.493	0.55 (0.63)	0.09 (0.07)	A=0.72 C=0.44	A=0.02 C=0.59	0.04	<0.003	17.0	17.1	20.8	0.17	21.17 (7.4)
			512 0.1	0.074																	
64	8/26	1.116 (65.48)	FW-50 0.1	C-F 0.075	Al+++ 0.01	Alum 0.0082	Soda Ash 0.0041	80.94	FW-20 0.675	0.836	0.48	0.08							18.5	0.10	20.03
			512 0.1	0.075																	
65	8/27	1.123 (65.89)	FW-50 0.1	C-F 0.186	Al+++ 0.01	Alum 0.0204	Soda Ash 0.010	163.45	FW-20 1.363	1.765	0.47	0.08							18.5	0.08	8.0
			512 0.1	0.186																	
66	8/27	1.002 (58.79)	FW-50 0.1	C-F 0.070	Al+++ 0.01	Alum 0.0077	Soda Ash 0.0038	179.23	FW-20 1.495	1.646	0.46	0.07							15.0	0.07	23.83
			512 0.1	0.070																	
J.M.	Hyflo Super Cel & Alum & Soda Ash to body feed.																				
67	8/28	1.044 (61.25)	FW-50 0.1	C-F 0.072	Al+++ 0.01	Alum 0.0080	Soda Ash 0.0040	27.49	Super Cel 0.229	0.424	0.48	0.05							60.1	0.05	22.05
			512 0.1	0.072				3.021	Alum 0.025												
								1.511	Soda Ash 0.013												
68	8/30	1.062 (62.31)	FW-50 0.1	C-F 0.040	Al+++ 0.01	Alum 0.0044	Soda Ash 0.0022	52.47	Super Cel 0.438	0.597	0.62 (0.39)	0.06 (0.05)	A=0.78 C=0.33	A=BDL C=0.54	0.07	<0.003	17.8	0.29	79.7	0.05	38.83 (21.8)
			512 0.1	0.040				5.769	Alum 0.048												
								2.892	Soda Ash 0.024												

APPENDIX C-4 (CONTINUED)

Run No.	Date	Filter rate gpm/ft² (m³/m² day)	Precoat, lbs /ft²	Precoat, lbs / 1000 gal	Polymer or coag. in precoat, g/g of D.E.	Polymer or coag. in precoat, lbs / 1000 gal	Other chem. in precoat, lbs / 1000 gal.	Body feed, mg/l	Body feed, lb. / 1000 gal.	B.W. solids, lbs / 1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORI Fibers x 10⁶/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibers x 10⁶/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hr (Time to Sample)
69	9/3	1.048 (61.49)	FW-50 0.1	C-I 0.070	Al+++ 0.01	Alum 0.0077	Soda Ash 0.0038	91.82	Super Cel 0.766	1.043	0.63	0.06							85.5	0.05	22.83
			512 0.1	0.070				10.09	Alum 0.084												
								5.059	Soda Ash 0.042												
J.M. Celite 512 & Alum & Soda Ash to body feed.																					
70	9/4	1.035 (60.72)	FW-50 0.1	C-I 0.071	Alum 0.01	0.00071	Soda Ash 0.0039	28.47	512 0.237	0.424	0.67 (0.71)	0.06 (0.06)	A=1.61 C=0.33	A=BDL C=0.54	0.10	<0.003	30.3	0.70	88.9	0.09	22.6 (4.6)
			512 0.1	0.071				3.126	Alum 0.026												
								1.572	Soda Ash 0.013												
71	9/5	1.086 (63.72)	FW-50 0.1	C-I 0.065	Alum 0.01	0.00065	Soda Ash 0.0036	41.57	512 0.347	0.538	0.67	0.06							104.0	0.11	22.76
			512 0.1	0.065				4.568	Alum 0.038												
								2.292	Soda Ash 0.019												
J.M. Celite 512 & anionic polymer to second step of precoat.																					
72	9/6	1.108 (65.01)	FW-50 0.1	C-I 0.067	A-23 0.00003	2.02×10^{-6}		27.95	512 0.233	0.406	0.44 (0.51)	0.05 (0.08)	A=0.72 C=0.39 EPA A=1.449 C=0.289	A=BDL C=1.67 Cincinnati A=0.054 C=0.235	0.07	<0.003	13.6	0.26	101.6	0.03	22.37 (2.4)
			512 0.1	0.067				3.072	Alum 0.026												
								1.539	Soda Ash 0.013												
J.M. Celite 512 & Alum & Soda Ash to second step of precoat. J.M. Hyflo Super Cel to body feed, Catfloc B to raw water.																					
73	9/9	1.146 (67.24)	FW-50 0.1	C-I 0.068	Al+++ 0.01	Alum 0.0074	Soda Ash 0.0037	20.51	Super Cel 0.171	0.322	0.50 (0.46)	0.05 (0.05)	A=1.0 C=0.5	A=BDL C=1.0	0.04	<0.003	15.4	0.64	32.3	0.06	21.5 (3.5)
			512 0.1	0.068				0.5678	Catfloc B 0.0047												
74	9/10	1.131 (66.36)	FW-50 0.1	C-I 0.089	Al+++ 0.01	Alum 0.0098	Soda Ash 0.0049	61.33	Super Cel 0.512	0.710	0.56	0.05							31.2	0.06	16.5
			512 0.1	0.089				0.6102	Catfloc B 0.0051												

APPENDIX C-4 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs./1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs/1000 gal.	Other chem. in precoat, lbs/1000 gal.	Body feed, mg/l	Body feed, lb./1000 gal.	B.W. solids, lbs/1000 gal. (B.W. vol. as % of treated water)[8]	Avg. turb. (Turb. @ time of sample), TU Raw	Filter	ORF Fibers x 10^6/l Raw	Filter	NWQL Amphibole mg/l Raw	Filter	UMD Fibers x 10^6/l Raw	Filter	Terminal HL Ft. H_2O	Turb. TU	Run Length, Hrs. (Time to Sample)
75	9/11	1.181 (69.29)	FW-50 0.1	C-F 0.067	Al+++ 0.01	Alum 0.0074	Soda Ash 0.0037	130.78	Super Cel 1.091	1.241	0.68	0.06							23.1	0.04	21.05
			512 0.1	0.067				0.5786	Catfloc B 0.0048												
J.M.	Celite	512 to body feed, Catfloc B to raw water.																			
76	9/12	0.940 (55.15)	FW-50 0.1	C-F 0.085	Al+++ 0.01	Alum 0.0093	Soda Ash 0.0047	22.22	512 0.185	0.374	0.40	0.06							13.9	0.06	20.92
			512 0.1	0.085				0.6605	Catfloc B 0.0055												
77	Pump	Malfunction																			
78	9/13	1.093 (64.13)	FW-50 0.1	C-F 0.111	Al+++ 0.01	Alum 0.012	Soda Ash 0.0061	48.80	512 0.407	0.652	0.44 (0.40)	0.05 (0.08)	A=0.02 C=0.06	A=BDL C=0.06	0.09	<0.003	30.0	0.51	32.3	0.04	13.75 (1.7)
			512 0.1	0.111				0.5983	Catfloc B 0.0050												
J.M.	Aqua Cel to body feed, Catfloc B to raw water.																				
79	9/16	1.092 (64.07)	FW-50 0.1	C-F 0.077	Al+++ 0.01	Alum 0.0085	Soda Ash 0.0042	27.33	Aqua Cel 0.228	0.397	0.42 (0.37)	0.05 (0.04)	A=0.9 C=0.1	A=0.02 C=0.06	0.08	<0.003	20.3	0.81	25.4	0.06	19.83 (1.5)
			512 0.1	0.077				0.3323	Catfloc B 0.0028												
80	9/17	1.120 (65.71)	FW-50 0.1	C-F 0.085	Al+++ 0.01	Alum 0.0093	Soda Ash 0.0047	71.57	Aqua Cel 0.597	0.783	0.50	0.06							18.5	0.05	17.53
			512 0.1	0.085				0.3455	Catfloc B 0.0029												
81	9/18	1.062 (62.31)	FW-50 0.1	C-F 0.074	Al+++ 0.01	Alum 0.0081	Soda Ash 0.0041	135.23	Aqua Cel 1.128	1.290	0.52	0.07							18.5	0.07	21.28
			512 0.1	0.074				0.3094	Catfloc B 0.0026												

APPENDIX C-4 (CONTINUED)

Run No.	Date	Filter rate gpm/ft2 (m^3/m^2 day)	Precoat, lbs./ft2	Precoat, lbs./1000 gal.	Polymer or coag. in precoat, g./g. of D.E.	Polymer or coag. in precoat, lbs./1000 gal.	Other chem. in precoat, lbs./1000 gal.	Body feed, mg/l	Body feed, lb./1000 gal.	B.W. solids, lbs./1000 gal. (B.W. vol. as % of treated water)[a]	Avg. turb. (Turb. @ time of sample), TU Raw	TU Filter	ORF Fibersx10^6/l Raw	ORF Fibersx10^6/l Filter	NWQL Amphibole mg/l Raw	NWQL Amphibole mg/l Filter	UMD Fibersx10^6/l Raw	UMD Fibersx10^6/l Filter	Terminal HL Ft. H_2O	Terminal HL Turb. TU	Run Length, Hrs. (Time to Sample)
J.M. Celite 512 & Alum & Soda Ash to body feed, no Catfloc B.																					
82	9/19	1.054 (61.84)	FW-50 0.1	C-F 0.238	Al+++ 0.01	Alum 0.026	Soda Ash 0.013	97.15	512 0.810	1.460	0.53	0.06	A=						101.6	0.05	6.62
			512 0.1	0.238				10.68	Alum 0.089												
								5.35	Soda Ash 0.045												
83	Run terminated due to overheated motor.																				
84	Run terminated due to overheated motor.																				
J.M. Celite 503 & Alum & Soda Ash to body feed.																					
85	9/20	1.069 (62.72)	FW-50 0.1	C-F 0.153	Al+++ 0.01	Alum 0.017	Soda Ash 0.0084	61.10	503 0.510	0.925	0.45	0.05	A=1.3 C=0.2	A=0.02 C=0.33	0.07	0.003	19.1	0.45	46.2	0.05	10.2 (5.5)
			512 0.1	0.153				6.716	Alum 0.056												
								3.365	Soda Ash 0.028												
86	9/20	1.043 (61.19)	FW-50 0.1	C-F 0.143	Al+++ 0.01	Alum 0.016	Soda Ash 0.0079	62.93	503 0.525	0.921	0.49	0.06							37.0	0.06	11.17
			512 0.1	0.143				6.917	Alum 0.058												
								3.465	Soda Ash 0.029												

[a] B.W. volume was not measured.

[b] A=amphibole, C=chrysotile